MANUFACTURING PLANT PRODUCT SAFETY/REGULATIONS GUIDE

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ABSTRACT: This document is a cross-reference tool on product safety topics and documents. While originally designed for use in the Manufacturing Product Safety Coordinator's Training Program, it can also stand alone.

APPLICABILITY: Reference guide for all Manufacturing Plant Product Safety and Regulations Coordinators.

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CHAPTER 1

INTRODUCTION

It is the policy of Digital Equipment Corporation to design, manufacture, and sell high quality products that are reliable and safe. Our own internal standards meet or exceed the requirements set by the appropriate regulatory agencies in the countries where we do business.

To carry out this commitment, Corporate Product Safety has the responsibility for initiating and maintaining a corporate-wide Product Safety Program. This program includes Product Safety functions in Engineering, Field Service, Product Groups, Europe, GIA, and all Manufacturing Groups.

There are Safety and Regulations Managers for each manufacturing group, and Plant Product Safety and Regulations (PPS/R) coordinators for each manufacturing plant. Basically, the Manufacturing Product Safety organization is responsible for ensuring that the products we manufacture and ship continue to be safe and compliant with specified requirements.

This Guide was developed for the Plant Product Safety and Regulations (MPS&R) Council as an information management tool to assist you, the PPS/R Coordinator, in accessing information–internal and external to Digital–that impacts your effectiveness.

Within this Guide we have gathered the abstracts of documents that are essential to your job. Use it as an index and an information locator to enable you to turn to the source documents that you need. It is tab indexed for your convenience and it can accommodate additional related information that you may choose to add, as well. Examples of this type of additional information could include copies of UL/CSA inspection reports from other plants, letters of comment from UL/CSA inspectors, and memos from Corporate Product Safety and other product safety groups. Share this supplemental information with other Product Safety people and groups.

You will find the information organized into three categories corresponding to the Coordinator's three primary areas of responsibility: Administrative, Technical, and Financial. Please note that we have designed each section to be independent of the others so that each section is self-supporting. It also means that you will see a certain amount of repetition throughout. This is intentional. Wherever possible we have tried to tailor the comments about documents that appear in more than one subject heading to highlight topic-specific information.

We are interested in your inputs and ideas on how to improve this Guide to better meet your needs. To make it easy for us to evaluate and incorporate comments, please write them down, using the reader's comment form found at the end of this Guide.

1.1 GENERIC SAFETY AND REGULATIONS ROLE

Safety and Regulations (SAR) is involved in the following functions with regard to Corporate products.

a. Communications

1. Establish systems for communication of existing, updated and evolving standards and regulatory requirements.
2. The SAR is responsible for communicating to the internal and external environment all applicable aspects of safety and regulations. This includes cross-functional groups, management, external vendors and agencies.
3. Communicate the objectives, strategies and activities of the MPSR Council.
4. The SAR supports Corporate in communicating one position to the external environment, including agencies and vendors.

b. SAR Council

1. Represent applicable group at, be involved in and influence the Manufacturing Product Safety and Regulations Council.
2. The SAR is responsible for providing input to planning and problem resolution that may affect Corporate. The SAR supports the planning and problem resolution in their businesses.

NOTE

This area will be expanded based on the output of the "group growth process", particularly in SAR responsibilities around group (SAR Council) objectives and strategies.

c. Administration

1. The SAR is responsible for the generation and maintenance of the group OPAL procedure.
2. The SAR has the responsibility to establish the policies within the group for any activity as it relates to safety and regulatory requirements.
3. The SAR supports Corporate for any internal or agency bills that may be generated for their plants.
4. The SAR is responsible for their administrative systems being common to and consistent within the safety and regulatory world. The SAR supports Corporate in the effort to design administrative consistency for the safety and regulatory function.
5. The SAR provides support, both to Corporate and their facilities, to ensure the consistency among like procedures.

d. Manufacturing Process

1. Influence the establishment, utilization and on-going evaluation of manufacturing process control systems.
2. Influence the establishment of an effective assessment system which provides manufacturing with objective feedback relative to the effectivity of product safety/regulatory systems and process control/support systems overall.

e. Influence

1. The SAR is responsible for being proactive in their businesses/groups to ensure that Manufacturing Product Safety and Regulations is an integral part of the manufacturing process.
2. The SAR is responsible to foster management awareness and understanding of manufacturing compliance with standards and regulations and solicit support.
3. Provide direction and guidance to the PPSRC's management in support of PPSRC development and training.

f. Existing Products

1. SAR is responsible for keeping abreast of any new safety/regulatory requirements that may affect the build/repair of an older product and convey those requirements to their PPSRCs. The SAR supports the PPSRCs in translating these requirements for their particular businesses or manufacturing sites.
2. The SAR supports Corporate to ensure required labels are used on products.
3. The SAR is responsible for translating Corporate policies into specific business policies for their environment. The SAR supports Corporate and PPSRCs by ensuring that applicable business specifications/standards written by others, address safety and regulatory issues.
4. When and where necessary, the SAR is responsible for developing standards and specifications for their businesses. The SAR supports Corporate and PPSRCs by ensuring that applicable business specifications and standards written by others address safety and regulatory issues.
5. The SAR provides support to various organizations within their businesses (i.e., purchasing, vendor engineering) to ensure alternate vendors' products and services do not impact Digital from a safety/regulatory standpoint.
6. The SAR supports the Traceability Program by providing information about their businesses to the groups responsible for developing the data bases to ensure the programs handle SAR's businesses in a time/cost efficient manner. The SAR supports their businesses by providing guidance and direction to those implementing traceability within their sites.

g. Regulations

1. The SAR will develop programs aimed at compliance to external agencies and internal standards.
2. The SAR is responsible for providing information to their groups relative to the impact of current and evolving standards and regulations. The SAR provides their groups' impact assessment to Corporate so that Corporate may assess the total manufacturing safety and regulatory impact.
3. The SAR is responsible to provide pertinent data to allow standards owners to influence change to internal standards and external regulations.

h. New Products

1. The SAR shall support the design activity in the areas of phase review, manufacturing "hand-off" and regulatory changes on all new products being developed within their groups.

2. The SAR shall provide leadership in manufacturing product safety and regulatory requirements as they relate to new technologies.

i. Documentation

1. The SAR has the responsibility to ensure proper documentation is in place as required to meet the safety and regulatory requirements for the group.

2. The SAR provides support for manufacturing process documentation to meet all requirements and regulations that are applicable to the process.

3. The SAR is responsible to ensure that all information related to standards and regulations is properly distributed within their business function.

j. Cross-functional Links

1. The SAR shall serve as the focal point in all areas of Manufacturing Product Safety and Regulations for all issues within their groups as they relate to other functions across the corporation.

2. The SAR is responsible to establish the necessary links and resources to ensure a business-sensitive approach (Digital wide) is taken in addressing any issue which is regulatory/safety related.

k. Training

1. The SAR is responsible to coordinate the development and implementation of training plans and programs related to standards and regulations.

l. New Business Activity

1. The SAR is responsible to develop and coordinate standards and regulations programs for "new business activities" to ensure compliance. Involvement in new business activity may include new ventures and country-specific regulations and external management.

2. The SAR will coordinate manufacturing compliance issues for any cooperative marketing effort undertaken by their group.

3. The SAR will perform a risk analysis for their group regarding external agency requirements when new business activity is being evaluated.

m. Problem Solving

1. The SAR is responsible for obtaining solutions to those problems that directly affect their group. Examples of areas where problems may occur include the following:

   Digital
   Manufacturing
   Vendors (internal and external)
   Customers
   Standards (internal and external)
   External agencies

2. The SAR is responsible for ensuring that the problem solving process is consistent and logical and that the solutions are implemented in a timely, cost effective manner.

3. When a problem occurs outside of the SAR's direct sphere of influence, the SAR may be called upon to provide support in solving these problems. For example, the list of potential problem areas above would also affect Digital as a corporation. In that instance, Corporate would be responsible for solving the problem, but the SAR may be asked for support.

CHAPTER 2

THE ROLE OF THE PLANT PRODUCT SAFETY AND REGULATIONS COORDINATOR

2.1 PPS/R COORDINATOR'S ROLE IN MANUFACTURING PRODUCT SAFETY ADMINISTRATION

Manufacturing Product Safety Administration, according to outside agencies as well as Digital's established policies, resides with the highest plant administration body, the Plant Staff.

In order to achieve the desired goals within the specific facilities, Plant Managers have delegated the Product Safety Administration functions to the Product Safety Coordinators. In fact, this was written into contract with CSA at the time Digital received Category Certification.

One of Digital's main objectives is to produce safe products that conform to design specifications and international agency/regulatory standards. This is, of course, a responsibility shared by all employees. Each Product Safety and Regulations Coordinator functions as a catalyst in plant's product safety programs, enabling each function to meet its responsibilities.

The Coordinator does this by:

- Acting as the focal point for administrating the plant/business product safety effort.
- Being a product safety technical resource/expert.
- Collecting and reporting the financial costs associated with the plant/business product safety effort.

2.2 PPS/R COORDINATOR'S ADMINISTRATIVE RESPONSIBILITIES

The key word is "administration", the managing of the product safety program, according to agreed-upon policies and objectives. Some key administrative areas are to:

- Develop and document the plant/business product safety program.
- Develop and implement product safety plans to accomplish goals and objectives of the product safety program.
- Educate and train plant employees about the product safety program and their respective responsibilities as slated in the plan.
- Schedule internal and external audits and tests.
- Document and communicate on a regular schedule the product safety status for internal and external accountability.
- Maintain an up-to-date library of applicable internal and external documents.

- Design and implement a record retention and control program that satisfies internal/external product safety needs.

2.3 PPS/R COORDINATOR'S TECHNICAL RESPONSIBILITIES

The Plant Product Safety/Regulations Coordinator has a variety of technical responsibilities. They include:

- Perform internal audits of manufacturing process, product, external vendors and subcontractors.
- Maintain a current file for each product.
- Evaluate new products and ECOs for compliance.
- Investigate, identify, assess, and resolve product safety problems (such as, product incidents, variation notices, and discrepancies).

2.4 PPS/R COORDINATOR'S FINANCIAL RESPONSIBILITIES

The Plant Product Safety/Regulations Coordinator has the following financial responsibilities:

- Prepare, report, and monitor the product safety budget.
- Collect and report all costs related to the product safety program (such as, library costs, corrective action costs, and testing).
- Training, travel, and like items.

2.5 ATTRIBUTES OF A SUCCESSFUL ADMINISTRATOR

To be a successful PPS/R Coordinator, one should have the following attributes:

- Leadership, including the ability to make decisions within the scope of his or her authority.
- Honesty, integrity, and credibility.
- Organizational skills.
- Good interpersonal skills, including diplomacy and firmness.
- Selling ability.
- Good communication skills, both oral and written.
- Documentation control ability–handling files and records.
- Knowledge of the company, products, and general technical information, including UL/CSA regulatory experience.
- Objectivity and creativity, especially as these apply to the ability to define, specify, and resolve problems.
- Understanding of financial impact.
- Training ability.
- Ability to prioritize and meet commitments.
- Capacity to operate under pressure and adverse circumstances.

These qualities are necessary for a coordinator to be successful in program administration. You are encouraged to add to this list and to strengthen your role in the plant's product safety program by taking courses and attending seminars in the above areas.

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CHAPTER 3

ADMINISTRATIVE TOPICS

This chapter contains information of an administrative nature.

3.1 PRODUCT SAFETY PROGRAM AND PLAN

As resident expert in product safety matters, the PPS/R Coordinator is responsible for directing the development and implementation of the Product Safety Program. The program includes goals and a means of measuring and reporting performance against these goals.

The Product Safety Plan is the key document which describes how to accomplish the Product Safety Program goals. Each manufacturing facility must have a Product Safety Program with input and approval from all plant/business functions. The Product Safety Program and Plan must be compatible with, and is sometimes a subset of, the plant/business Quality Plan and objectives.

The following documents are guidelines in formatting product safety programs and plans:

EL-00115-00 **DEC STD 115-0 Manufacturing Plant Documentation (MPD) Identification and Control**

Abstract: This standard describes the document identification and control requirements necessary to index and retrieve manufacturing plant documentation. Use it in setting up and formatting your documents.

Comments:

- Applies to the description of processes/procedures programs unique to the plant/business.
- Provides the basis for a corporate level index to permit visibility and accessibility of plant generated documents throughout the corporation.
- Specifies document identification codes necessary to support the index.
- Format guidelines/control processes for MPD documents are outlined.

76-65287-00 **Format Procedure for Writing Engineering Specifications**

Abstract: This specification describes format requirements and content guidelines for Process Engineering, Maintenance, and Process Operator Specifications. It applies only to 7665 series Engineering Specifications.

Comments: In spite of the limitation regarding the use of this specification, and a review of other Digital documents DEC STD 001-0 and DEC STD 101-0 outlining guidelines for format and content, this specification provides the greatest assistance to the PPS/R Coordinator in formulating his or her PPS/R Program (Plan).

3.2 CERTIFICATION PROGRAMS

This subhead outlines documents relating to the policies and procedures of two major certification agencies, Underwriter's Laboratories (UL) and the Canadian Standards Association (CSA) committed to and used by Digital. It also deals with documents that describe Digital's product safety requirements and procedures.

UL **Testing for Public Safety**

Abstract: This document provides a comprehensive summary of the Underwriter's Laboratories organizations, its facilities, types of services offered, standards setting programs, publications offered and the relationship UL has with other councils and standards setting organizations.

Comments: This document should be very helpful to the PPS/R Coordinator by furnishing a complete picture of UL and its operations.

(Free Publication)

UL **Method of Development - Revision and Implementation of Underwriter's Laboratories Standards for Safety**

Abstract: This document covers a detailed account of how UL Standards are developed and maintained and tells who participates and the standards review/approval process. An appeals procedure is also included along with a section on periodic review and revision of UL Standards.

Comments: See especially the section titled: Services Available from UL". This is a concise, complete one page summary which should be of value to the PPS/R Coordinator. Four services are noted with their accompanying methods of identification marking. They are:

- Listing and follow-up service.
- Classification and follow-up service.
- Recognition and follow-up service.
- Certification and follow-up service.

(Free Publication)

UL **Listing and Follow-Up Service Agreement**

Abstract: This document contains the terms of agreement between the Digital facility applying for UL Certification and Underwriter's Laboratories. Covered are:

- Definitions
- UL Follow-Up Procedure
- Use and Control of UL Listing Mark
- UL's Limitation on Liability
- Manufacturing Program of Production Inspection and Testing
- UL Inspection
- Confidentiality of Information
- Termination of Agreement

(Free Publication)

UL **Working Together**

Abstract: This booklet is designed to provide information and guidance to companies using, or intending to use, the listing, Classification, or Recognition Services available from Underwriter's Laboratories.

Comments: The information provided is useful in processing submittals with a minimum expenditure of time and money.

(Free Publication)

UL **Recognized Component Directory**

Abstract: The UL Recognized Component Directory lists the names of companies, along with their specific products, that have been qualified to use a UL Recognition Mark on or in connection with those products. The symbol (9J) may also be applied.

Comments: This annually published directory is an important reference document for the PPS/R Coordinator to verify component vendor recognition.

CSA **Certification Division-Policies and Procedures, May 1980**

Abstract: This document outlines CSA policy with respect to the services offered by its Certification Division. It is also a guide to the procedures which must be followed in carrying on these policies. Detailed information is provided regarding CSA certification programs from application through approval/implementation. In addition, key definitions for CSA terminology are provided.

CSA **Application and Records Group - How to Apply for CSA Certification**

Abstract: This pamphlet outlines the application procedure for CSA certification. Four key areas are covered:

- Application for Certification
- Deposit
- Product Samples
- Supporting Information

CSA **Certification Division - Why Certification?**

Abstract: This pamphlet defines the meaning and rationale for CSA Certification. In addition, it briefly describes the Canadian Standards Association.

CSA **Service Agreement**

Abstract: To be supplied

CSA **Questionnaire for Category Certification Programs**

Abstract: This is a key CSA document! It is used to provide CSA with basic information regarding the manufacturing facility applying for certification and its processes and control procedures. Also included are sections on:

- Organization
- Design Control
- Inspection Test Plans
- Measuring and Testing Equipment
- Purchasing
- Inspection
- Corrective Action
- Records
- Summary

Comments: This questionnaire must be satisfactorily completed by the manufacturing facility and reviewed in depth by CSA prior to the granting of CSA Category Certification. In addition, this document must be maintained and updated on an ongoing basis. The information contained will be previewed by the CSA Inspector during his or her quarterly plant inspection.

CSA **List of Certified Electrical Equipment, (a.k.a. Blue Book)**

Abstract: This is a key CSA reference used by the PPS/R Coordinator to determine whether specific electrical equipment purchased from a manufacturer is CSA certified.

This equipment is usually identified by the company name under which it is listed. Alternatively, it may be identified by a tradename, trademark, or the CSA field number (recognized by the prefix LR or LL). A list of tradenames, trademarks, file numbers, and corresponding company names is provided.

EL-00028-00 **DEC STD 028-0 Phase Review Policy**

Abstract: This standard defines the structure of the Phase Review Process for both hardware and software products. It names the phases, establishes the phase exit criteria, identifies a minimum set of milestones within each phase, addresses phase transition meetings, and identifies reference information.

Comments: The Phase Review Process addresses product safety milestones that must be met.

EL-00031-02 **DEC STD 031-2 Product Serialization - Site Codes**

Abstract: Section 2 specifies how to derive two-character site codes from the three-character codes defined in the Digital Facility Communications Directory. This is to accommodate the existing processes, stamps, tags, systems, forms, and documents that are used by manufacturing and engineering.

Comments: Serialization of products provides the required product safety criteria of:

- Origin of product manufacture
- Date of product manufacture
- Traceability of product

EL-00059-00 **DEC STD 059-0 Incoming Inspection Requirements**

Abstract: Section 0 establishes the general policy regarding requirements and responsibilities for Incoming Inspection Procedures.

EL-00060-00 **DEC STD 060-0 Design and Certification of Hardware Products to National and International Regulations and Standards; Policies and Procedures**

Abstract: Defines the intentions, responsibilities, and controls for designing and certifying Digital hardware products to meet the requirements of nationally and internationally recognized organizations.

EL-00062-00 **DEC STD 062-0 Product Submittal to Regulatory Agencies**

Abstract: This standard defines the various agencies around the world to which our products must be submitted. It also identifies Digital personnel in various countries who submit our products to these agencies, the submittal procedures, and legally-mandated labeling procedures.

Comments: This standard, in conjunction with DEC STD 060, defines Digital's Product Safety Policy.

EL-00064-00 **DEC STD 064-0 Compliance with International Language Requirements**

Abstract: This standards presents Digital's policy on compliance with language requirements of countries other than the United States. The regulations cited in this standard affect shipping information, labeling, words on products, messages produced by products, and customs, commercial, and technical documentation accompanying products sent to customers located outside the United States. This standard also details the major languages spoken by our customers throughout the world.

EL-00116-00 **DEC STD 116-0 Workmanship Standards Manual**

Abstract: This document provides the criteria for craftsmanship to be used in manufacturing and maintaining Digital products.

Comments: Good assembly craftsmanship is critical to safe products.

EL-00119-00 **DEC STD 119-0 Digital Product Safety - Introduction and General Requirements**

Abstract: Section 0 defines the intentions and criteria to be used during design and development of new products.

EL-00119-01 **DEC STD 119-1 Digital Product Safety - Design Criteria**

Abstract: Section 1 presents product safety design criteria.

EL-00119-02 **DEC STD 119-2 Digital Product Safety - Test Procedures**

Abstract: Section 2 presents test procedures required to determine whether products meet design criteria.

EL-00119-05 **DEC STD 119-5 Digital Product Safety - Process for Design, Evaluation, Testing, and Certification of Hardware Products to Product Safety Requirements**

Abstract: Section 5 specifies the process to be followed to ensure that Digital hardware products are designed to be safe, compliant with internal and external product safety standards, and able to be certified by outside agencies.

Comments: DEC STD 119 defines design requirements for safe Digital products and provides product compliance verification through tests and checklists.

EL-MF069-00 Corrective Action Request Procedure

Abstract: This procedure relates to internal, Digital produced non-conforming product where a Digital plant receiving the product required corrective action from the supplying plant or applicable product design group. Included are corrective action responsibility forms and time schedules for completion dependent on degree of defect severity.

Comments: This procedure can be applied by the PPS/R Coordinator for safety hazard type defects and for compliance type defects on products recovered from other plants. With respect to certification maintenance, this procedure can be used to provide evidence of corrective action taken to satisfy UL/CSA Variation Notices.

EL-MF096-00 Acceptance Stamps - Use and Control Procedure

Abstract: This specification details the use and control procedures for acceptance stamps assigned within Digital plants and their assigned external subcontractors. This procedure applies to all of Digital's marketable products including those built/assembled/repaired by subcontractors. Also described in this specification are the various stamp configurations, markings, and the locations on the various types of products/assemblies where the acceptance stamps must be placed.

Comments: The use of acceptance stamps on UL/CSA certified products provides evidence that appropriate tests and inspections have been performed. In particular, the hipot/ground continuity tests required by UL/CSA on 100% of production.

EL-MF277-00 Electrical Safety Product Test Procedure

Abstract: This specification describes the requirements and procedures for ground continuity and dielectric withstand (hipot) tests performed to verify the electrical safety of Digital's products.

Comments: The application of the above tests is mandatory for all products with primary powered voltages in excess of 42.4 Vac (30V rms). It is a key requirement of UL/CSA Certification Programs. These tests are required on 100% of production unless stated otherwise by UL/CSA standards or written authorization.

EL-MF326-00 Manufacturing Systems Assessment Procedure - Introduction, Guidelines and Instructions

Abstract: This procedure provides a uniform method for assessing Digital and external manufacturing plant capabilities for controlling process and product quality and for assessing plant compliance with manufacturing milestones of the Product Certification Program.

Comments:

- The use of this procedure will provide each Digital plant an unbiased review of the plant's capabilities and allow strengthening/corrective action to be taken prior to both initial and ongoing CSA Category Certification Inspections.
- The checklists used in this procedure have their basis in the CSA Category Certification checklists used by CSA Inspectors.

EL-MF345-00 through EL-MF345-07 **Supplier Quality Survey**

Abstract: This is a series of specifications that contains all of the necessary forms, checklists and procedures used to obtain sufficient information to determine whether or not a particular vendor/subcontractor has the potential to provide Digital with safe, compliance reliable quality product. The specifications may be used for:

- Initial Surveys
- Follow-Up Savings
- Audits

Covered in this series are:

- Section 0 - Introduction
- Section 1 - Preliminary Purchasing Survey
- Section 2 - General Information
- Section 3 - Quality Survey - General
- Section 4 - Castings Quality Survey
- Section 5 - Plating/Conversion Coating Quality Survey
- Section 6 - Organic Coating Quality Survey
- Section 7 - Plastics Quality Survey

Comments: Supplier Quality Surveys can provide the PPS/R Coordinator with vendor/subcontractor information to enable him/her to decide whether and/or when they can become CSA Certified. Once a vendor/subcontractor is certified, these surveys can provide an advance warning of system deficiencies so that timely corrective action can be taken.

Corporate Product Safety, Product Safety Change Request Procedure (UL/CSA Change Request Procedure)

Abstract: This procedure is to be used by the PPS/R Coordinator to communicate product changes to Corporate Product Safety involving UL Follow-Up Procedures and/or CSA Product Reports. A UL/CSA Change Request Form is provided with complete instructions to ensure that the required information and appropriate attachments necessary to make the change are included.

3.3 EDUCATION AND COMMUNICATION

Effective education programs and good communication skills are basic tools of the PPS/R Coordinator. People throughout the plant are more likely to support the Product Safety Program if it is understood and its importance is believed. It is up to the Coordinator to be a highly visible representative of the Program and to help each member of the plant understand and carry out their product safety responsibilities. Find out who the training professionals are in your plant and how they can help you in this effort.

3.3.1 Memorandums

Helpful Hints:

a. When you discuss something by telephone, follow-up with a brief memo; it's good to keep records.

b. After you distribute a memo, follow up with a telephone call.

c. If you receive no response from your first memo, forward a copy of the old memo, and, under the Subject, write the following:

"SECOND REQUEST"

d. If you receive no response from the "SECOND REQUEST", forward the old memo, and, under the Subject, write the following:

"THIRD REQUEST"

e. If a "THIRD REQUEST" is sent, also send a copy to your boss and to the boss of the person who received the original memo.

Before writing a memo, ask yourself the following questions:

a. Am I clear on why I am sending this memo? Or, what do I hope to accomplish by sending this memo?

b. Does this memo provide information only? Or, who needs to know about the contents of the memo?

c. Does this memo ask for help or assistance with a problem?

d. Who will receive this memo? Who is on the distribution list?

e. Who will receive a copy? (of this distribution)

Writing techniques for memos and reports:

a. Keep sentences short.

b. Give sufficient background information to help the reader understand the full meaning and intention of the memo or report.

c. Provide specifics.

d. Start new paragraphs when starting a new topic or after about eight lines of text.

e. Set unequivocal points apart from the rest of the paragraph by indenting.

f. Keep it simple.

Organizing by outline for memo or report writing:

a. Write everything down that comes to mind concerning the topic you're communicating; don't worry about the sequence–you can work on that later.

b. Address related issues if you want to.

c. Number every fact and thought you plan to include in the memo.

d. Arrange the sentences logically and renumber later.

e. State the point or points you wish to make.

Things to avoid:

a. Being sarcastic.

b. Using slang.

c. Overstating your case.

d. Being indirect or camouflaging the real issue.

e. Pushing the panic button.

3.3.2 Overview of Basic Problem-Solving

a. Make outline statements of the situation.

b. Identify the problem or problems.

c. Organize the information you have and look for information that is lacking.

d. Identify possible solutions–use flow charts.

e. Make a list of things you don't want and are afraid you might get. You always have choices. People are usually more in touch with what they don't want than what they do want.

f. Know what you don't want. Examine and evaluate your options; the more options, the better.

g. Decide between the alternatives.

h. Find real solutions to real problems on actual schedules with available resources.

3.3.3 Helpful Reference Reading

Following are some valuable resources to help you write more effectively:

Alberti, Robert E., Michael L. Emmons, Your Perfect Right, 3rd edition, Impact Publishers, San Luis Obispo, California, 1978, 193 pp.

Brusaw, Charles T., Gerald J. Alredd, Walter E. Olie, Handbook of Technical Writing, St. Martin's Press, New York, 1976, 571 pp.

Glorfeld, Louis E., David A. Lauerman, Norman C. Stageberg, A Concise Guide for Writers, 5th edition, Holt, Rinehart and Winston, New York, 1980, 226 pp.

Lesikar, Raymond V., Report Writing for Business, Richard D. Irwin, Inc., 1981, 386 pp.

Strunk, William, Jr., E. B. White, The Elements of Style, 3rd edition, MacMillan Press, New York, 1979, 200 pp.

3.4 PRODUCT SAFETY AUDITS/REPORTS

Product safety audits and inspections are the key evaluation techniques in measuring the plant's product safety effort in responsible accountability.

3.4.1 Audits

Preparation before agency audits:

a. Review the last audit report.

b. Ensure that all past discrepancies have been corrected.

c. Plan for the audit:

1. Make any travel arrangements necessary.

2. Make hotel/motel arrangements as necessary.

3. Reserve conference room for duration of audit.

4. Ensure that all supporting people know when they will be needed and what is expected of them.

5. Ensure all areas subject to audit are neat, clean, and functional.

6. Ensure that all necessary documentation is available and up-to-date.
7. Know what products are currently being manufactured.
8. Review product files.

d. Do preaudit.

During the audit:

a. Meet the auditor and escort him or her throughout the visit.

b. Accommodate the auditor's requests as much as possible.

c. For new products, have a product safety design engineer present.

d. Do not volunteer information; if he or she wants specific information, it will be requested.

e. Question the auditor if he or she is incorrect or if you do not understand a requirement as stated.

f. Do not argue with the auditor.

g. Do not be antagonistic or hostile with the auditor.

h. Make notes during the audit.

i. Negotiate with the auditor any corrective actions needed.

j. Attempt to resolve critical variation notices with the auditor immediately.

k. Get a copy of the auditor's report at the end of the audit. If possible, review the report for accuracy before the auditor leaves.

After the audit:

a. Take action point-by-point or get others to take action to resolve any discrepancies stated in the auditor's report or to resolve any variation notice.

b. Write a letter responding to the auditor's report; this letter will normally indicates that corrective action is being taken in response to the audit discrepancies.

c. Send a formal report of the audit to your manager, which may include, but is not limited to, the following:

1. Agency name
2. Name of auditor(s)
3. Area of inspection
4. Products inspected
5. Audit results and action required, if any

3.4.2 Safety Audit Documentation Files

Since safety audits and inspections are extremely important exercises, it is extremely important that all available documents that are generated before, during and after an audit or inspection be filed.

The safety files contain folders for the following documents.

a. UL follow-up reports

b. Change requests

c. Old pages of the follow-up reports

d. Files for pertinent memos concerning products

e. Test data files

f. CSA files

Controlled Component Index

Controlled or critical components are those UL recognized or UL listed components specified by UL and are found in the follow-up report for each product. The index contains columns for the following items.

a. Model/variation/voltage rating

b. Part description

c. DEC part number

d. Manufacturer's part number

e. Manufacturer's name

f. Electrical rating of each part

g. Check column for CSA approved

h. Check column for UL approved

i. Check column for test data

Request Log Book

Additional audit information is contained in the Change Request Log Book, such as the following items.

a. In-house change request number

b. Model and variation name

c. Date the change request was sent to Manufacturing P/SR office

d. Date the change request is acknowledged by UL

e. Date change is completed

f. "Okay" column

g. "Comments" column

Proactive Ways to Keep Informed of New Parts

To be involved and be informed and knowledgeable with regard to new parts, take the routine steps listed here.

a. Attend new products meetings

b. Review every ECO and ECR that comes out

c. Give Purchasing the latest Controlled Component Index for their information

d. Audit products on the floor

e. Request a copy of QVL for proof that the new part is acceptable for use.

The audit file cabinet should contain the following items.

a. A file by model or model/variation, depending on volume

b. Folders labeled OPEN and CLOSED for each model/variation

NOTE

OPEN folder will include the Product Safety Action Log which spells out the problem found during the safety audit and noted on the Product Safety Checklist. Once the Verified column is checked, the sheet moves into the CLOSED folder.

c. Component Index

d. Blank copies of the Audit Checklist

The following items are kept in a separate file cabinet.

a. Unit assembly drawings

b. Purchase Specifications for electrical parts

c. Mechanical drawings

Save Old Pages of UL Report

When a new UL page comes in, it will have a revised date. The most current revised date will replace the existing page which is now called an OLD page. All OLD pages are kept with the product file in a folder labeled OLD.

A "Weekly Corrective Action Plan" report may go out in hard copy or electronically to the following members of management.

a. Quality Managers and Supervisors

b. Business Managers

c. Production Managers

d. External Resource Manager

e. Customer Satisfaction Manager

f. Engineering Supervisors

g. Incoming Inspection Supervisor

h. Production Supervisors

In addition to the managers and supervisors, the report will go to responsible persons for action items on the report.

The monthly roll up goes only to the following managers.

a. Business Managers

b. Quality Managers

c. Production Managers

d. External Resource Manager

e. Engineering Manager

f. Customer Satisfaction Manager

The Product Safety Checklist

Go through each item in the Follow-up Report and make a question to correlate with each item. Also include CSA specific requirements and UL section general requirements. If the question agrees OK, but if it does not then it gets put on the Product Safety Action Log then later on to the Corrective Action Log.

Write down things as you find them. Use the form so that all of your questions and answers are in the same place.

When it comes to Hi-pot test, use the number of the tester as well as the number of the person performing the test and the date the test is done.

The tester is tested before it is used for testing. Minimum testing of the Hi-pot tester is daily. If the tester fails the test, this means the tester is working because the test simulates a Hi-pot failure. If the tester passes the test, this means it is not recording failures. Refer to DEC Hi-Pot Specification A-SP-ELMF277-0-0.

Product Traveler

The Product Traveler is a form used from beginning to the end of the line to record the serial number for each item in each product. Product Safety records serial numbers for components that need traceability. For example, power supplies, drives, line filters and whatever else we want to maintain traceability on. Hi-pot test information goes with the Product Traveler. The Hi-pot line on the form is to include the tester's Hi-pot stamp and the serial number of the Hi pot tester that is used. These records are archived as well as a daily log being kept.

Audit Schedule

Find out from Production Control the breakdown of how many products will be built by month and by quarter (Master Build Schedule).

a. Make a list of all the products that you are going to be building.

b. Figure out how many of each product is to be built for the quarter.

c. Divide by three for months and 12 for weeks.

Always let the Production Supervisors know about the audit schedule. They may want to join you in the audit.

Audits should be scheduled as follows:

Greater than 100 per week—weekly
Greater than 100 per month—monthly
Less than 100 per month—quarterly

Flammability

Check the component print and specification to determine the flammability rating. Then check the flammability specification to determine how often testing (flammability) should be done to satisfy UL and CSA requirements for electrical parts, enclosures, non electrical parts, air filters and air moving devices.

In most cases, we are using UL recognized plastics, so typically we are testing for CSA. CSA testing requirements are that samples must be tested every six months if samples are not being tested in lots. Refer to Flammability Specification A-SP-ELCE059-TM-002N.

Flammability Test Report Trail

Incoming Inspection fills out Flammability Test Reports and keeps the gold copy as a record of the test sample of material being submitted. The lot of material is then held, pending the test results.

Incoming then sends the pink, yellow and white copies to Dana DeBlois along with the sample for test and a record of test results. Dana keeps the white copy and returns the yellow and pink copies to Incoming Inspection. If flammability is met, the lot is released. If the material does not meet the flammability requirements, the lot is rejected. Incoming replaces the gold copy with the pink copy and forwards the yellow copy to PPSC.

The advantages of this trail are as follows:

a. PPSC has records of tests on file

b. Ensures that forms are properly filled out

c. Knowledge of rejections in tests

If material has been rejected for not meeting flammability requirements, it goes to the Material Review Board who works the problem. The problem could be with the material sent by the vendor.

a. Is the test material the right material?

b. Is the flammability rating correct?

c. Did the inspector apply an incorrect rating?

d. Should the material be tested in applications?

Rejected material is put in a holding area for disposition. If the safety criteria is to be waivered, PPSC must sign off or reject it.

File flammability test results by part number. Make up a file by classes, inside classes and part number (for example, 36, 48, 79, 74, 90). When you are doing an audit, you can check for latest flammability test by class and part number.

Incoming Inspection records all lots that are received on history cards which include the dates of receipt and flame test. CSA randomly checks history files at Incoming Inspection.

Keep a log book for flammability tests on critical parts only (fans, foam and plastics). Record part numbers, part names, part manufacturer, date of test and material. What rating did it meet? The log saves time to find out if it is time for new testing. Has it been more than six months since the last flame test?

To find out if material has come in and is due to be tested, refer to the incoming inspection history cards.

Cable and Harness

WFO has worked to get all their cable and harness vendors UL recognized. Boxes from vendors come in marked UL recognized. Eventually the individual cables will be marked UL recognized.

If harnesses are not UL recognized, they must be flame tested in accordance with Digital Specification A-SP-ELCE059-TM-002N. If you are not flame testing because the harnesses are UL approved, you should do stockroom audits to verify that all vendors are consistently marking the cables and harnesses.

3.4.3 Change Requests and ECO Procedures

EL-MF453-00 **Agency Change Request Procedure**

Abstract: This document describes the change request procedure used by Digital to amend agency certification after the initial agency inspection has occured.

What is a change request?

A change request is a request to Underwriters Laboratory to amend the follow-up services procedure to reflect proposed changes to a product.

The revision of the follow-up services procedure must be completed before implementing the change in construction.

What documentation is required to support a change request?

a. A completed change request form.

b. A copy of the follow-up service procedure with pages marked to indicate the changes.

c. If a variation notice, also include:

- A copy of the VN.
- A letter explaining steps taken to correct the problem.

d. If the change request is for an alternate vendor component, also include:

1. Manufacturer's name, model number, and the complete electrical rating information.

2. Evidence of component recognition. For example, a copy of the page from the UL Recognized Component Directory or a copy of the yellow card.

3. Copy of QVL Listing.

4. Test data (where applicable).

e. If an ECO is necessary, also include:

1. Copy of ECO.

2. Test data (where applicable).

What are causes for change requests?

a. Engineering change orders

b. Manufacturing changes

1. Change of manufacturing location.

2. New vendors' components.
3. Change to the hi-pot process caused by either new test equipment or a request for hi-pot exemption.

c. Documentation errors

3.4.4 Underwriters Laboratory Initial Production Inspection (IPI)

IPI is a form of follow-up services inspection, which has existed for many years–most frequently in the consumer product area (irons, toasters, typewriters, and others).

While the Engineering department of Underwriters Laboratory and your local Underwriters Laboratory Inspector share the decision to perform an IPI, the decision of which category a new product or change request belongs in rests with the Underwriters Laboratory Engineering department. The four categories follow:

Category 1

IPI required in all cases

- New client
- New product category for existing client
- New manufacturer for existing client
- New or additional factory location for currently listed product

Category 2

IPI required if significant changes in the product are required by UL prior to Listing the product

- New section added to the procedure
- Additional model numbers added to the procedure
- Revised or alternate construction to existing procedure

The UL Inspector has the option to conduct an IPI. If he or she does not, he or she must contact the manufacturer to allow use of the Listing mark and inspection will take place at the next regular visit.

Category 3

IPI requested (only minor modifications required to make the product acceptable for Listing

- New section added to the procedure
- Additional model numbers added to the procedure
- Alternate construction changes to existing procedure

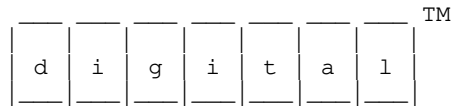
If regular visit has not yet been conducted, the inspector will perform IPI. Otherwise, he or she will wait until the next scheduled visit.

Category 4

IPI not required for minor revisions to Listed products

Note that prior to the implementation of IPI, the manufacturer could label and ship product after the procedure was received.

- With IPI, the manufacturer must not label the product until the inspector approves. (Categories 1 and 2)
- The manufacturer will receive notification from UL when IPI is required.



<Date>

Mr Steve Schmid
Follow-Up Services
Underwriters Laboratories, Inc.
1285 Walt Whitman Road
Melville, Long Island, N.Y. 11747

Subject: Variation Notice Order No. <1>, Dated <2>

Reference: File No. <3>, Vol. <4>, Sec. <5>, Issued <6>

Dear Mr Schmid,

The following is our response to the subject Variation Notice.

(List each item with explanations, as required on the Variation Notice.)

Sincerely,

<your name>

<your department>

****

1. The order number is found in the upper left hand corner of the Variation Notice, on the fourth line down.
2. The date is the Variation Notice is issued, found just below the Order Number.
3. The file number is Digital's UL File Number, found below the Order Number.
4., 5., and 6. Vol, Sec, and Issue Date are usually referenced on the first line of the text of the Variation Notice.

Figure 3-1. Sample - Request for Revision of UL Follow-Up Procedure

3.5 PRODUCT SAFETY MATERIALS PROBLEMS

It is important that the plant/business Quality plan include detailed procedures to follow when safety problems with sourced materials arise at incoming inspection, at test, or at any point in the manufacturing cycle thereafter.

3.5.1 External (Suppliers/Vendors) Sourced Materials

Our vendors and suppliers of controlled materials (those that are UL/CSA, VDE, and other agencies compliant) have contractually agreed to supply Digital with compliant material according to the purchase specification. Their agreement can be verified by referring to UL's Recognized Component Directory and CSA's List of Certified Equipment. New vendors and suppliers must agree to those requirements before Digital can place orders with them.

3.5.2 Internal (Digital) Sourced Materials

It is the responsibility of the Plant Product Safety Coordinator to ensure that materials received, including those shipped from another Digital facility, are fit to be used in the product that his or her facility manufactures.

3.5.3 Guidelines for Handling Product Safety Materials Problems

The following statements should be used as guidelines to provide a general philosophical framework. Not all possibilities are considered, nor is every conceivable permutation covered.

- Verify material identification.
- Review pertinent inspection/test results.
- Check out any test equipment involved: calibration, maintenance, correct usage, etc.
- Determine if correct test/inspection procedures were followed.
- Obtain and record complete data on material, including vendor history, serial numbers, model numbers, date codes, etc.
- Obtain/review all available documentation that refers to the material in question.
- Evaluate to the extent possible and define the problem concisely (PRELIMINARY).
- If appropriate, do a random sample of additional material to assist in determining the magnitude of the problem.
- Alert in-plant personnel/function/management to the safety problem encountered; discuss hazards, risks, dangers involved; evaluate problem further as appropriate. (Functional responsibilities and interactions should be defined in the Plant/Business Quality Plan.)
- Ensure the internal (Digital) source is notified of the problem along with any pertinent information developed above. The Plant Product Safety Coordinator should be in direct contact with his or her counterpart in the source plant.
- Develop or ensure development of a mutually agreeable procedure to handle the problem until a permanent solution can be found.
- Make direct contact with Group Product Safety outlining the problem and providing available pertinent information. Solicit Group assistance as appropriate.

- Develop and maintain complete records of the problem and what was done to correct it.
- Ensure that material under investigation is isolated until the issue is resolved.
- Ensure control over the activities dealing with the problem. Maintain close contact with all parties involved until the problem is resolved.
- Verify the facts and define the problem before communicating that a safety problem exists.
- Communicate and ensure communication with the Digital source plant, Component Engineering, and Purchasing.
- Contact the Product Safety Coordinator in the source plant.
- Document and maintain records.
- Make use of in-plant knowledge.

NOTE

Communication of the problem does not relieve the Product Safety Coordinator's concern/responsibility for ensuring resolution of the problem as far as his or her plant/business is concerned. Do not assume that the Digital source is automatically at fault.

3.6 PROCEDURE FOR DEVELOPING A CONTROLLED PARTS LIST

Following are the steps to develop a controlled parts list.

- Gather the required data:
  - **a.** Bill of Materials (BOM) or Parts List (PL)
  - **b.** Unit Assembly Drawing (UA)
  - **c.** UL Follow-up Procedure
  - **d.** Access to QVL
  - **e.** Access to purchase specifications
  - **f.** Access to Table 1-15 of DEC STD 119-1
  - **g.** Controlled parts data sheet (refer to Figure 3-9)
- Make a list from Bill of Materials or Parts List omitting component parts that are obviously not controlled; resistors, screws, nuts, and washers are examples.
- Review list against UL Follow-up Procedure to eliminate more non-regulated parts. Care must be taken not to eliminate parts that are covered by general requirements such as wire and plastic.

  If you are unable to verify a part from the BOM/PL to the UL Follow-up Procedure, refer to the UA.
- Using the QVL, you can determine vendors and vendor part numbers. In cases where the UL Follow-up Procedure defines vendor and vendor part number, you should ensure the QVL doesn't list more vendors. If it does, you may need to generate a change request to add alternate vendors.

- Between the BOM and QVL, you should be able to get all the data you need to complete a controlled parts list.
- Consult a Product Safety Design Engineer when requirements are unclear as to whether on not a component should be controlled.
- Once each list is generated by product, this information should be shared with plant traceability individual. These lists must be updated as changes occur.

Regulatory Controlled Parts

Primary Circuit Motors
Fans (above 30 volts)
Primary Circuit Connectors
Fuses
Fuseholders
Circuit Breakers
Power Cords and Cord Sets
Wire and Cable
Connectors
Strain Relief
Primary Circuit Switches
Interlock Switches
Line Filters
Line Filters with Receptacles
Relays above 30 Volts
Varistors
Capacitors
Plastics (resin)
Printed-Wiring Boards
Printed-Wiring Board Laminates
CRTs
Power Supplies
Lithium Batteries
Air Filters
Subassemblies or Products using Primary Power
Wiring Harnesses
Direct Plug-in Transformers
Fiber Optic Cable

PRODUCTS_ _ _ _ _ _ _ _ _ _ _ _

Table 1: Controlled Parts Data Sheet

DEC P/N	VENDOR(S)	VENDOR(S)	DESCRIPTION

CHAPTER 4

TECHNICAL TOPICS

This chapter outlines areas of technical information vital to Plant Product Safety and Regulations Coordinators.

The following is reprinted from A-MN-ELEN408-00, Guidelines for the Design of International Products:

The Standards Environment -

The importance of standards is not a product of our modern times; the recognition of the value of standards has been accepted for centuries.

The Magna Carta of 1215, stating the charter of English political and civil liberties, also contained a chapter on standards.

With modern civilization becoming more and more complex, the need for more standards is on the increase! Specifically, as customers, we tend to forget that standards have become a vital part of our daily life. Some typical examples of standards are weights and measures, electric light bulbs, film for cameras, and video tapes.

Even as professionals, we have become so accustomed to standards that we often tend to forget them; worse even, we do not really appreciate their values!

The facts remain, however, that standards have aided technological advancement, industrial expansion, and the consumer markets.

Without project-standardization between the various organizations involved in the lunar projects, it would not have been possible for the international TV viewer to witness moon landings!

When the need for a standard was recognized, interested parties would organize a meeting to discuss such. This often resulted in an organization that could provide a frame work in which a standard consensus could be developed and approved.

History -

Around the beginning of the 20th century the need for standardization was fairly widespread , and, as a result, several organizations were formed. The following table shows the founding dates of several selected standards organizations which, in more recent years, also became concerned with standardization within the computer industry, and those originated specifically for the development of computer-related standards.

1865	International Telegraph Union
1893	Association of German Electrotechnical Engineers
1894	Underwriters Laboratories, Inc.

1901	British Standards Institution
1901	National Bureau of Standards
1906	International Electrotechnical Commission
1907	U.S. National Committee of IEC
1918	American National Standards Institute
1919	Canadian Standards Association
1924	Electronic Industries Association
1926	International Organization for Standardization
1930	National Fire Protection Association
1940	American National Standards Committee Z39
1945	Japanese Standards Association
1947	Pan American Standards Commission (COPANT)
1949	Japanese Industrial Standards Committee
1957	CCITT
1958	Japan Electronic Industry Development Association
1959	CODASYL
1960	International Federation for Information Processing
1961	European Committee for Standardization
1961	American National Standards Committee X3, X4
1961	ISO/TC95, ISO/TC97
1961	European Computer Manufacturers Association
1970	Standards Council of Canada

The computer and information processing fields have seen several benefits of the existing standards organizations.

When suggestions were made that standards should be established for EDP and office equipment (OM), mature and well-established organizations were available to accept responsibility for the development of these needed standards.

Work has, today, progressed even further: international harmonization of several computer safety standards is well on its way.

Objectives -

The objectives of almost all national and international standards bodies are so similar that they could be thought of as carbon copies:

Development of standards
Coordination of standards development
Promulgation of standards
Establishment of standards
Exchange of information

At technical levels, the objective is to develop a standard for a specific kind of product or process. Those would be achieved through a technical committee with a scope and program of work.

Membership -

Membership of standards organizations varies but, in general, at:

International level, members represent nations, and at
National level, individual members represent companies, consumer organizations or interest groups.

There are, obviously restriction: for example, the American National Standards Institute (ANSI) represents the United States in the International Standards Organization (ISO); no other standards organization in the USA could become a member.

Digital is a member of several national and international standards organizations. Several employees participate in standards work, either in technical committees and/or in management functions. To mention a few:

ACESA	Australian Computer Equipment Suppliers Association
ANSI	American National Standards Institute
BETA-UK	Business Equipment Trade Association
CBEMA	Computer and Business Equipment Manufacturers Association
CCITT	International Telegraph and Telephone Consultative Committee
C-BEMA	Canadian Business Equipment Manufacturers Association
ECMA	European Computers Manufacturers Association
IEEE	Institute of Electrical and Electronic Engineers
SAA	Standards Association of Australia

For more information on the subject of Digital's membership in standards organizations, contact Gary Robinson or John Atkins.

4.1 EXTERNAL REGULATORY AGENCIES

In addition to UL and CSA, there are other agency standards and codes that influence Digital's product safety and regulatory programs.

- Product Safety

BSI	British Standards Institute
CSA	Canadian Standards Association
IEC	International Electrotechnical Commission
TUV	Technischer Uberwachungs-Verein-W.Germany-Certifying
UL	Underwriters Laboratories-U.S.
VDE	Verband Deutscher Elektrotechniker, W. Germany, German Eletrical Engineering Society

- Telecommunications

BABT	British Approval Board for Telecommunications
CCITT	Consultative Committee International Telephone and Telegraaph
DOC	Department of Communications - Canada
FCC	Part 68 - U.S.
JATE	Japan Approvals Inst for Telecom EQP
PTT	Postal Telegraph and Telephone - Europe

- Electromagnetic Compatibility (EMI)

CISPR	Communications Int. Special Des Pertubations Radioelectiques - France
FCC	Part 15 - U.S.
FTZ	Fernmeide Technisches Zentralamt - W. Germany

- Others

ASC	Australian Standards Committee
BRH	Bureau of Radiological Health - U.S. - T.V.
DOC	Department of Commerce - U.S.
DOD	Department of Defense - U.S.
FDA	Federal Drugs Administration - U.S. Laser Technology
GIDEP	Government Information Data Exchange Program - U.S.
NEC	National Electrical Code (USA)
OSHA	OCC Safety and Health Agency - U.S.
Statskontoret	Accoustic Noise - Sweden

4.2 MANUFACTURING PRODUCT SAFETY TESTING

The testing required by Digital and the outside agencies whose requirements we follow can be divided into three categories: engineering (or design) tests, type tests, and manufacturing tests. Test results must be maintained by each facility for each type/model product it produces. This includes UL or CSA specific test results, where applicable. The PPS/R Coordinator shall ensure that this information is received from an Engineering Product Safety group, Component Engineering, vendors, etc., and filed accordingly.

The following concepts and documents relate to manufacturing product safety testing.

4.2.1 Engineering Tests (Design Tests)

EL-00119-00 **DEC STD 119-0 Digital Product Safety - Introduction and General Requirements**

Abstract: Section 0 defines the intentions and criteria to be used during design and development of new products.

EL-00119-01 **DEC STD 119-1 Digital Product Safety - Design Criteria**

Abstract: Section 1 presents product safety design criteria to be applied to all products.

EL-00119-02 **DEC STD 119-2 Digital Product Safety - Test Procedures**

Abstract: Section 2 presents general information about test procedures required to determine that products meet design criteria of DEC STD 119-1 and lists the detailed Test Methods which define the procedures to perform a specific test.

EL-00119-05 **DEC STD 119-5 Digital Product Safety - Process of Design, Evaluation, Testing, and Certification of Hardware Products to Product Safety Requirements**

Abstract: This standard specifies the process to be followed by Product Safety and Design Engineering groups to ensure that Digital hardware products are designed to be safe, compliant with internal and external product safety standards, and capable of certification by outside agencies.

Comments: DEC STD 119 defines design requirements for safe Digital products and provides product compliance verification through tests and checklists.

The basic test requirements include:

Hi-pot
Input leakage
Temperature Rise
Stability
Current Draw

An Engineering Product Safety group is responsible for performing the engineering tests defined in DEC STD 119-2. A report of the tests performed and the results of those tests is to be maintained at the manufacturing site that produces the product.

The test results obtained at the time of engineering qualification of the products can be requested by the UL/CSA (or other agency) inspector, during the plant visit, and therefore should be properly maintained. That is, they should include: date tests were performed, the need for continuing or periodic retest, signature of authorized individual (including his or her qualification to perform the test.)

NOTE

Due to the uniqueness of a particular configuration, it may sometimes be necessary to perform some engineering testing within manufacturing.

4.2.2 Type Tests (Component Tests)

Specific components or parts may require special Type tests that are performed by the vendor. They are then either verified or sampled at Incoming Inspection or Component Engineering Labs. These tests are contractually agreed upon with our vendors and/or subcontractors through purchase specifications and must be verified as the components enter the Incoming Inspection area. For instance, incoming inspection must verify that the HI-POT stamp appears every place it is required.

NOTE

Some type tests require a periodic retest or lot testing. Some, like flammability and the tests performed on the adhesives on labels, are done at the Materials Research Laboratory in Maynard, MA. Test results must be maintained at the plants.

4.2.3 Manufacturing Tests

The only manufacturing tests that are required by all the regulatory agencies are ground continuity and hi-pot. This does not preclude other Manufacturing Product Safety testing, such as fuseholder wiring, X-ray emission, etc., that can be requested either by Design Engineering or Process Engineering.

EL-MF277-00 **Electrical Safety Product Test Procedure**

Abstract: This specification describes the requirements and procedures for the Ground Continuity and Dielectric Withstand (Hi-Pot) Tests.

4.3 MARKING AND LABELING

This section covers all available documented Digital specifications and standards that refer to marking and labeling. The information reference here is used to satisfy both internal Digital requirements and external agency requirements.

EL-MF029-00 **Procedure for Identifying Multiple Use Boards Without Handles**

Abstract: This procedure establishes a method of identifying flip chip modules without handles when the board used has more than one type component configuration.

EL-MF064-00 **Date-Coding Material**

EL-MF111-00 **Cable Location Labeling**

EL-MF343-00 **Cable and Harness ID Labels - Criteria and Application Methods**

EL-00002-00 **DEC STD 002-0 Ac Power Wiring, Safety Grounding, Receptacle and Electrical Rating Information Requirements**

Abstract: This standard defines requirements for ac power wiring and grounding, types of outlets, power cords and plugs, and nameplates to be used on Digital products.

Comments: Examine the following subheads:

5.3 Warning on Decals on Equipment

5.6 Terminal Markings

5.7 Power Cord Markings

8 Electrical Rating Information Requirements

EL-00005-00 **DEC STD 005-0 Operational Alert (OPAL) Procedure**

Abstract: Section 0 describes how an OPAL (Operations Alert) message is authorized and issued to stop shipment of a product that has a safety defect or a serious functional defect.

EL-00005-01 **DEC STD 005-1 In Plant Product Hold Procedure**

Abstract: Section 1 describes the significance of product hold tags and tells how to use them.

EL-00005-02 **DEC STD 005-2 Hardware Products Non-Compliant with Digital Standards**

Abstract: Section 2 describes the procedure for reporting products that do not comply with DEC STD 002, 052, 053, 060, 062, 102, 103, 119, or 122.

EL-00022-00 **DEC STD 022-0 Cable and Harness Documentation: Part Identification Requirements**

Abstract: Defines part numbering system for cables and harnesses.

EL-00030-00 **DEC STD 030-0 Module Manufacturing Standard**

Abstract: Summarizes the module design rules and practices used to optimize the manufacture of modules and backplanes.

Comments: Examine the following:

Subhead 3, Product Safety Rules

Table 6, UL type and circuit features

Figure 14, General UL marking module information

Table 13, Marking and tooling features required within Printed circuit outline.

EL-00031-00 **DEC STD 031-0 Product Serialization**

Abstract: Defines products that require serial tags and provides a uniform serial numbering and identification scheme and format for all Digital products.

Comments: Examine the following subheads:

2, Serialization Requirements

2.1, Definition of Products to be Serialized

2.5, Application of Serial Tags

3, Serial Number Format

2.1.5, Location of serial tags

EL-00031-01 **DEC STD 031-1 Product Model Changes**

Abstract: Section 1 describes how to label products that are modified after the product serial tag has been applied and before shipment to a customer.

Comments: Examine the following subheads:

2.1, Model Designation Changes

3, Safety and Regulatory Requirements

EL-00032-02 **DEC STD 031-2 Site Codes**

Abstract: Section 2 specifies how to derive 2-character site codes from the 3-character codes defined in the Digital Facility Communications Address Directory.

EL-00055-00 **DEC STD 055-0 Purchase Specifications: Guidelines**

Abstract: This standard establishes general instructions and responsibilities for the preparation and control of Digital Purchase Specifications.

Comments: Examine subhead 2.2.1, Format Outline

EL-00056-00 **DEC STD 056-0 Logic Symbology - Circuit Schematic Requirements**

EL-00056-03 **DEC STD 056-3 Discrete Electronic and Electromechanical Component Symbols**

Abstract: Provides detailed requirements for using discrete electronics and electromechanical symbols on circuit schematics.

Comments: Examine subhead 3, which lists acceptable logic ground and chassis ground symbols for schematic drawings.

EL-00060-00 **DEC STD 060-0 Design and Certification of Hardware Products to National and International Regulations and Standards**

Abstract: Section 0 defines the intentions, responsibilities and controls for designing and certifying Digital hardware products to meet the requirements of nationally and internationally recognized organizations.

Comments: Examine the following subheads:

1.5.1, Type of conformance

1.5.2, Language compliance

3.3, paragraph C, reference to UL/CSA labeling

4, Physical alterations to certified or listed products

EL-00103-01 **DEC STD 103-1 FCC Labeling and User Manual Information**

Abstract: Provides an overview of the process for labeling equipment and modifying user manuals in response to FCC regulations cited in FCC Rules Part 15.J.

Comments: Also see the following sections:

1A, FCC Nonverification Labeling

1B, FCC Compliance Labeling and User Information

1C, FCC Compliance Equipment User Information

EL-00112-00 **DEC STD 112-0 Standard Date Format for Output**

Abstract: Ensures unambiguous interpretation of dates by readers around the world. Specifically for documentation.

EL-00115-00 **DEC STD 115-0 Manufacturing Plant Documentation (MPD)**

Abstract: Describes document identification and control requirements necessary to index and retrieve manufacturing plant documentation.

Comments: Examine subhead 3.1, Document Identifier.

EL-00116-00 **DEC STD 116-0 Workmanship Standards Manual**

Abstract: This document provides the criteria for craftsmanship to be used in manufacturing and maintaining Digital products.

Comments: Examine the following subheads:

7, Module Identification/Marking

2, Product Safety

EL-00119-01 **DEC STD 119-1 Digital Product Safety - Design Criteria**

Abstract: Section 1, in describing product safety design criteria, details the markings used to identify equipment.

Comments: Examine the following subheads:

12.2, Methods for Grouping Permanently Connected Equipment

14, Equipment Markings

16.4, Markings (for accessory equipment)

EL-00128-00 **DEC STD 128-0 Confidential Engineering Information and Documentation: Policy and Requirements**

Abstract: This standard defines requirements for classifying, labeling, storing, and distributing engineering documentation classified "RESTRICTED DISTRIBUTION" or for "INTERNAL USE ONLY".

Comments: Examine subhead 2.1.2, Marking Requirements

EL-00178-00 **DEC STD 178-0 Digital Marking Standard**

Abstract: This standard establishes marking requirements for identification of items produced by or for Digital.

EL-CP414-00 **International Regulatory Symbols**

Abstract: This document is a regulatory symbol identification guide which includes the majority of symbols found on Digital's products.

4.4 ENGINEERING CHANGE ORDERS (ECOs)

The engineering change order is the official vehicle for making changes to all released parts and documents at Digital. Because the Plant Product Safety and Regulations Coordinator is responsible for assuring compliance to safety and regulatory requirements of Digital products within his or her facility, it is up to that person to stay abreast of ECO activity. The following documents are concerned with the ECO process and its impact on product safety compliance.

EL-00060-00 **DEC STD 060-0 Design and Certification of Hardware Products to National and International Regulations and Standards**

Abstract: This standard defines the intentions, responsibilities, and controls for designing and certifying Digital hardware products to meet the requirements of nationally and internationally recognized organizations.

EL-00060-01 **DEC STD 060-1 Design and Certification of Hardware Products to National and International Regulations and Standards - Specific Requirements**

Abstract: This section cites specific Digital standards and external regulations and standards that apply to Digital's hardware product designs. It also lists requirements that have been investigated and found to be not applicable to Digital's hardware product designs.

EL-00100-00 **DEC STD 100 Engineering Change Orders**

Abstract: Describes policies, requirements, and procedures necessary to make changes to all released parts and documents. Special sections deal with hardware, purchase specifications, and diagnostic software ECOs.

EL-00119-00 **DEC STD 119-0 Digital Product Safety - Introduction and General Requirements**

Abstract: Section 0 defines intentions and criteria to be used during design and development of new products.

EL-00119-01 **DEC STD 119-1 Digital Product Safety - Design Criteria**

Abstract: This section presents safety design criteria.

EL-00119-02 **DEC STD 119-2 Digital Product Safety - Test Procedures**

Abstract: This section presents test procedures required to determine if products meet design criteria.

EL-00119-05 **DEC STD 119-5 Digital Product Safety - Process and Design, Evaluation, Testing, and Certification of Hardware Products to Product Safety Requirements**

Abstract: This section specifies the process to follow to ensure Digital hardware products are designed to be safe, compliant with internal and external product safety standards, and able to be certified by outside agencies.

EL-MF277-00 **Electrical Safety Product Test Procedure (Hi-pot and Ground Continuity Test)**

EL-MF075-00 **Procedure or Processing Non-conforming Material and In-process Waiver**

EL-MF314-00 **PAVES - Instructions, Completing Transfer and Flow Form**

EL-INDEX-00 **EL and 7665 Class Document Index**

Abstract: This is the index to information contained in EL class documents, including DEC Standards, the old 7665 specifications, and American National Standards Institute (ANSI) standards, under the control of Standards and Methods Control.

010501.ODP **Option Module List**

4.5 EMERGENCY PROCEDURES

The PPS/R Coordinator must be ready to react quickly and effectively to a wide range of product safety situations. Emergency procedures are an important part of the Plant/Business Safety Plan. Carefully developed emergency procedures which define the duties and responsibilities of each of the plant/business functions serve to minimize adverse effects of product safety events if and when they occur.

This section describes documents that deal with procedures for emergency procedures.

EL-00005-00 **DEC STD 005-0 Operational Alert (OPAL) Procedure**

Abstract: Section 0 of DEC STD 005 describes how an Operational Alert (OPAL) message is authorized and issued to alert the Corporation to a product which has a safety defect or serious functional defect.

Comments: The PPS/R Coordinator has direct concern only with product having actual/potential safety defects and with product in non-compliance with regulatory/agency standards.

Examine the following subheads:

3.3.1 Product Safety OPAL Procedures, which outlines in sequential steps how the OPAL originates through closure.

4 OPAL Information Content Requirements, which outlines the basic information required in OPAL messages.

EL-00005-01 **DEC STD 005-1 In-Plant Product Hold Procedure**

Abstract: This section of DEC STD 005 describes the procedure for placing a product on hold, removing a product hold, and various communication requirements.

Comments: The PPS/R Coordinator has a key role in in-plant product hold situations relating to product safety regulatory compliance - see paragraph 2, Procedures.

Correction, paragraph 3.1 (b), Contacts, Corporate Field Service Product Safety Investigator. Corporate Product Safety no longer performs the initial incident investigation.

See subhead 2, Procedure: While the Quality Manager is responsible for ensuring the procedure for implementing/removing in-plant hold is carried out, the PPS/R Coordinator will be acting as the Quality Manager's representative in most cases.

The paragraph outlines the sequential steps needed to implement/remove in-plant hold.

EL-00132-01 **DEC STD 132-1 Digital Field Service Product Safety Policies and Procedures Manual - Reporting Alleged Product Safety Incidents**

Abstract: This document defines Digital's policy, which will be followed by all of its employees when becoming aware of an alleged product safety incident and the process to be followed for the reporting of that alleged product safety incident, involving any part or product manufactured, sold, or serviced by Digital.

EL-00132-02 **DEC STD 132-2 Digital Field Service Product Safety Policies and Procedures Manual - Pre-Investigation of Alleged Product Safety Incidents**

Abstract: This standard defines what alleged product safety incidents are, decribes procedures for a local/on-site product safety representative to handle incidents and provides a form with instructions for the local/on-site product safety representative to report the alleged incident to Field Service Product Safety.

4.6 NEW PRODUCTS MANUFACTURING PRODUCT SAFETY

When a new product is introduced into a plant, the PPS/R Coordinator is responsible for reviewing the New Product Start-Up Plan for product safety requirements. The following documents pertain to this task.

EL-00060-00 **DEC STD 060-0 Design and Certification of Hardware Products to National and International Regulations and Standards**

Abstract: This standard defines the intentions, responsibilities, and controls for designing and certifying Digital hardware products to meet the requirements of nationally and internationally recognized organizations.

EL-00060-01 **DEC STD 060-1 Design and Certification of Hardware Products to National and International Regulations and Standards - Specific Requirements**

Abstract: This section cites specific Digital standards and external regulations and standards that apply to Digital's hardware product designs. It also lists requirements that have been investigated and found to be not applicable to Digital's hardware product designs.

EL-00102-00 **DEC STD 102-0 Environmental Standard for Computers and Peripherals - General Test Requirements**

Abstract: This standard consists of one general section and several specific sections and defines the environmental conditions to which products marketed by Digital must conform before being considered acceptable for product announcement.

EL-00119-04 **DEC STD 119-04 Digital Product Safety - Product Safety Design Review Checklist**

Abstract: Section 4 provides a product safety checklist for use during a new product's design review.

Comments: This document is to be used by the PPS/R Coordinator for preparing checklists for the verification of products new to the plant/business.

UL **Listing and Follow-Up Service Agreement**

Abstract: This document contains the terms of agreement between the Digital facility applying for UL Certification and Underwriter's Laboratories. Covered are:

Definitions
UL followup procedure
Use and control of UL Listing mark
UL's limitation on liability
Manufacturing program of production, inspection, and testing
Confidentiality of information
Termination of agreement

4.6.1 Policy for Record Retention in Engineering Groups

A product file maintained by an Engineering Product Safety Group shall contain the following:

a. A table of contents/revision level sheet for the product file

NOTE

Pages that have been revised should be moved to the back of the report and kept there.

b. Certificate of compliance/sign-off sheet

NOTE

This form will contain spaces for sign-off by the Product Safety Engineer and the prime Manufacturing Plant Product Safety or Regulations Coordinator.

c. Digital Product Safety Report

d. Underwriters Laboratories (UL) Report

e. All applicable test data

f. Test data in application or from Component Engineering for all known alternate transformer, line filter, and motor vendors.

g. Other agency reports, test data, as required for the particular product (IEC, TUEV, and so on)

h. A list of all controlled components (components that require CSA/UL marking and or control) and purchase speciification revision levels (This may be included in the Digital product safety report.)

i. Copies of the purchase specifications for the above controlled components (Optional)

j. Electrical schematics for power supplies or primary power distribution

k. All correspondence that may affect product safety, including copies of all agency correspondence and correspondence with the vendor for buyout products

If memos or checklists, which indicate that followup action for an item is necessary, are in the file, there must be an indication of the item being closed. This may be a memo, a note, documentation, or the correct construction described in the Digital Product Safety Report.

4.6.1.1 Prerequisites for Product Safety

a. DEC STD 119 review and testing completed

b. Underwriters Laboratories (UL) Listing or Recognition obtained

c. Canadian Standards Association (CSA) Product Certification obtained if the product is to be manufactured in any plant which is not CSA category-certified, and is subject to the following guidelines:

All products should begin production at a CSA category certified plant to take advantage of the category-certification program. If a product requires Product Certification, it must be done on a pre-planned basis so that the CSA submittal takes place at the same time as the UL submittal.
All other CSA product certifications which are requested after the hand-off is complete will be the responsibility of Manufacturing Product Safety.

d. Test data is complete and will meet the needs of CSA as well as UL.

e. Product file meets requirements of record retention policy for Engineering Product Safety.

4.6.1.2 Sign-off for Product Safety Handoff

a. The product file shall contain a certificate of compliance/-sign-off sheet on which the engineering product safety engineer shall sign-off to verify that the prerequisites for product safety handoff have been fulfilled.

b. The Manufacturing Plant Product Safety/Regulations Coordinator for the primary plant at which the product will be manufactured shall sign-off the sheet to indicate that he or she has accepted the product and product file.

4.6.1.3 First CSA Manufacturing Plant Inspection

The engineering Product Safety Engineer for each product will support the Manufacturing Plant Product Safety/Regulations Coordinator in the first CSA inspection of a product in a manufacturing plant. This inspection may be at a Digital qualified product safety test laboratory or in a manufacturing plant.

This support shall be available until such time that any initial problems are uncovered by CSA are resolved.

Engineering Product Safety has the responsibility of providing the funding required for the participation of the Engineering Product Safety Engineer in this process.

4.6.1.4 Manufacturing to Manufacturing Product Transfer Checklist

The checklist will be incorporated in EL-00424-00, DIGITAL PRODUCT SAFETY HANDBOOK.

UL file and updates—also microfiche

CSA file and test data (using approved CSA format/product forms)

List of controlled components used in each product

FCC status and test data (if applicable)

At least two past UL/CSA factory audit reports

List of deviations issued on the product and corrective action taken

HIPOT history on product/test process and procedure and record retention method

List of any pending change requests

List of any (unique) first time buy components which could slow production

List of any quality of OPAL alerts issued

List of any pending product safety investigations

Past list of site PPSC internal audit results

EMI/RFI test data (FCC part 15/68) to include certification letter, labels, product identification, pending activity and all test results

Transferring facility contact list to include Plant Manager, Plant Quality Manager, Engineering Manager, Plant Product Safety Coordinator and his/her alternate

Product Safety Engineering specifications

Product schematics

Product design/assembly drawings

Label layout - all labels/sample of product lables used in our product

Certificate of design compliance

ECO/ECR activity pending (any and all)

Any pertinent internal/external regulatory agency correspondence pending or necessary for product compliance

TELECOMMUNICATIONS INFORMATION AS FOLLOWS:

a. A product file which contains all country specific regulatory agency approval information (permit and certification).

b. All labeling information shall be maintained and conform to *DEC STD 178-3 Digital Marking Requirements for Completed Products Intended to be Sold.*

c. Products requiring FCC rule Part 68 certification will have the test results and agency approval information as part of the documentation.

d. A list of critical controlled components (pertaining to the communications interface) that directly affect the state of the signal path applied to the private or public switched network will be maintained.

e. Copies of all letters of attestation submitted to the Department of Communications, Canada, will be maintained.

4.7 ALTERATIONS, CONVERSIONS, RETROFITS, REPAIRS, AND REFURBS

The PPS/R Coordinator's role in dealing with alterations, conversions, retrofits, repairs, and refurbs is to make sure that a safe product is shipped to the customer. He or she ensures that all actions relating to the control and implementation of the plant's procedures are properly carried out.

This section presents the major documents dealing with alterations, conversions, retrofits, repairs, and reburbs.

EL-00002-00 **DEC STD 002-0 Ac Power Wiring, Safety Grounding, Receptacle and Electrical Rating Information Requirements**

Abstract: This standard defines requirements for ac power wiring and grounding, types of outlets, power cords and plugs, and nameplates to be used on Digital products.

EL-00005-00 **DEC STD 005-0 Operational Alert (OPAL) Procedure**

Abstract: This standard describes how an Operational Alert (OPAL) message is authorized and issued to stop shipment of a product that has a safety defect or a serious functional defect.

EL-00005-01 **DEC STD 005-1 In-Plant Product Hold Procedure**

Abstract: Section 1 describes the procedure for placing a product on hold, removing a product hold, and various communication requirements.

EL-00005-02 **DEC STD 005-2 Hardware Products Non-Compliant with Digital Standards**

Abstract: Section 2 describes the required procedure for reporting products that do not comply with applicable Digital standards.

EL-00031-00 **DEC STD 031-0 Product Serialization**

Abstract: This standard defines the requirements for product serialization and provides a uniform serial numbering scheme and format for Digital product.

EL-00031-01 **DEC STD 031-1 Product Model Changes**

Abstract: Section 1 describes how to label products that are modified after the product serial tag has been applied and before shipment to a customer.

EL-00031-02 **DEC STD 031-2 Site Codes**

Abstract: Section 2 specifies how to derive 2-character site codes from the 3-character codes defined in the Digital Facility Address Directory. This is to accommodate the existing processes, stamps, tags, systems, forms, and documents that are used by manufacturing and engineering.

EL-00059-00 **DEC STD 059-0 Incoming Inspection Procedures - General Policy**

Abstract: This standard establishes the general policy regarding requirements and responsibilities for Incoming Inspection Procedures.

EL-00059-01 **DEC STD 059-1 PAVES Incoming Inspection Documentation Requirements**

Abstract: Section 1 describes requirements for the Incoming Inspection documentation on the Part Analysis Vendor Evaluation System (PAVES).

EL-00059-02 **DEC STD 059-2 Incoming Inspection Procedures - Metal Fabrication and Plastics**

Abstract: This section establishes a uniform method for generating, controlling, and distributing Incoming Inspection Procedures (IIs) for metal fabrication and plastics.

EL-00059-03 **DEC STD 059-3 Incoming Inspection - Standard Operating Procedures**

Abstract: Section 3 establishes the minimum requirements for documenting standard operating procedures for Incoming Inspection areas. Defines flow of materials and forms, methods of identification and traceability, methods to control measuring equipment, and the required quality documentation for Incoming Inspection areas.

EL-00060-00 **DEC STD 060-0 Design and Certification of Hardware Products to National and International Regulations and Standards**

Abstract: This standard defines the intentions, responsibilities, and controls for designing and certifying Digital hardware products to meet the requirements of nationally and internationally recognized organizations.

EL-00060-01 **DEC STD 060-1 Design and Certification of Hardware Products to National and International Regulations and Standards - Specific Requirements**

Abstract: This section cites specific Digital standards and external regulations and standards that apply to Digital's hardware product designs. It also lists requirements that have been investigated and found to be not applicable to Digital's hardware product designs.

EL-00062-00 **DEC STD 062-0 Product Submittal to US and Foreign Agencies**

Abstract: This standard defines the various agencies around the world to which our products must be submitted. This standard also identifies the Digital people in various countries who submit our products to these agencies, the submittal procedures, and legally-mandated labeling procedures.

EL-00100-00 **DEC STD 100-0 Engineering Change Orders**

Abstract: This standard pertains to a unified procedure for submission of Engineering Change Orders. All engineering drawings and documentation filed in Engineering Document Control Centers can only be changes by the procedures outlined herein. ECOs are controlled and issued by the Engineering Services groups within Engineering.

EL-00100-01 **DEC STD 100-1 Engineering Change Orders - Hardware**

Abstract: Section 1 describes the policies, procedures, and guidelines used to create ECOs for Digital hardware. It also specifies the responsibilities and roles assigned to the various individuals and organizations that create, administer, and implement them.

EL-00100-1A **DEC STD 100-1A Engineering Change Orders - Engineering ECO Coordination Procedure**

Abstract: Section 1A defines the procedure used by an Engineering ECO Coordinator to support the ECO process for Digital hardware. The procedure for the overall process is given, together with a method of handling supplement ECOs and for validating or assisting in determining which engineers are responsible for a specific ECO process.

EL-00100-1B **DEC STD 100-1B Hardware ECO Form Procedure**

Abstract: Section 1B defines procedure for filling out ECO face sheets and associated forms required for hardware ECOs.

EL-00100-1C **DEC STD 100-1C Engineering Change Orders - Financing ECOs to Hardware**

Abstract: Section 1C describes the policy and procedure for financing ECOs to hardware.

EL-00100-02 **DEC STD 100-2 Engineering Change Orders - Purchase Specifications**

Abstract: Section 2 describes the policy and procedure for changing purchase specifications. Also specifies responsibilities and roles assigned to various individuals and organizations involved in the purchase specification ECO process.

EL-00100-03 **DEC STD 100-3 Diagnostic Engineering Change Orders and Patch Orders (DECOs and DEPOs)**

Abstract: Section 3 describes the policies and procedures for the administration and control of diagnostic engineering change orders, patch orders, and submissions of new diagnostic products to the Software Distribution Center.

EL-00101-00 **DEC STD 101-0 Manufacturing Operations Plan for Assembly, Inspection, and Test - Policy and Requirements**

Abstract: This standard presents a policy for the structure of a business within Digital. This plan allows product lines and businesses the flexibility to ensure that controls are implemented so all products are produced in conformance to specifications.

EL-00102-00 **DEC STD 102-0 Environmental Standard for Computers and Peripherals - General Test Requirements**

Abstract: This standard defines the environmental conditions to which products marketed by Digital must conform before being considered acceptable for product announcement.

EL-00102-01 **DEC STD 102-1 Temperature, Humidity, and Altitude Test Requirements**

Abstract: Section 1 defines environmental classifications and establishes test requirements used to ensure that hardware products meet temperature, humidity, and altitude requirements.

EL-00102-02 **DEC STD 102-2 Mechanical Shock and Vibration Test Requirements**

Abstract: Section 2 establishes the levels of mechanical shock and vibration that hardware products must be able to withstand.

EL-00102-03 **DEC STD 102-3 Physical Stability Requirements Shipping and Handling**

Abstract: Section 3 states the physical stability requirements for hardware products that are designed to be free-standing when installed. Two product states are considered: the product as installed and the product as shipped.

EL-00102-04 **DEC STD 102-4 Acoustic Noise Test Requirements**

Abstract: Section 4 specifies uniform procedures for measuring and reporting acoustic noise emission.

EL-00103-00 **DEC STD 103-0 Electromagnetic Compatibility (EMC) Hardware Design Requirements**

Abstract: This standard defines the limits of electromagnetic interaction between any of Digital's hardware products and their environments. It outlines measurement methodology, acceptability criteria, and responsibil- ities. Section 0 is an overview.

EL-00103-01 **DEC STD 103-1 FCC Labeling and User Manual Information**

Abstract: Section 1 provides the process for labeling equipment and modifying user manuals in response to FCC regulations cited in FCC Rules Part 15.J.

EL-00103-1A **DEC STD 103-1A FCC Labeling and User Manual Information**

Abstract: Section 1A describes the policy for labeling applicable Digital equipment that has not been verified or certified as complying with FCC regulations cited in FCC Rules, Part 15.J.

Section 1A Rev CX00, FCC Non-Verification Labeling

Abstract: This proposed Rev of Section 1A describes the policy for labeling applicable Digital Equipment that has not been verified or certified as complying with FCC regulations cited in FCC Part 15.J. Because non-verification labeling will only be required and permitted for a certain time period and under certain circumstances, this section of DEC STD 103 is expected to be voided and not applicable to most Digital products in the near future.

EL-00103-1B **DEC STD 103-1B Rev AX02, FCC Compliance Labeling and User Information**

Abstract: This proposed section describes the policy for labeling applicable Digital equipment that has been verified or certified as complying with FCC Regulations cited in FCC Rules, Part 15.J.

EL-00103-1C **DEC STD 103-1C Rev AX00, FCC Compliance Equipment User Information**

Abstract: This proposed section describes the policy for associating user information with Digital that has been verified or certified as complying with FCC regulations cited in FCC Rules, Part 15.J.

EL-00103-1D **DEC STD 103-1D Rev AX00, FCC Certification Approval Process**

Abstract: This proposed section describes the process for verifying or certifying Digital as complying with FCC regulations cited in FCC Rules, Part 15.J.

EL-00103-02 **DEC STD 103-2 Electromagnetic Interference (EMI) Control**

Abstract: Section 2 defines the internal Digital requirements corresponding with external, legal requirements about EMI, the test methodology, and the internal approval process.

EL-00103-03 **DEC STD 103-3 Electromagnetic Susceptibility (EMS) Immunity Control**

Abstract: Section 3 defines realistic electromagnetic immunity levels against the effects of radio and TV transmitters, as well as other electromagnetic spectrum pollution from industrial sources.

EL-00103-04 **DEC STD 103-4 Electrostatic Discharge (ESD) Control**

Abstract: Section 4 defines the test configurations and acceptability criteria for ESD control of EDP and office equipment.

EL-00106-00 **DEC STD 106-0 In-House Acceptance Procedures**

Abstract: This standard outlines the general steps to be followed in creating an acceptance procedure for all systems and options manufactured by Digital. Included are computers, options, special systems, interfaces, and others.

EL-00116-00 **DEC STD 116-0 Workmanship Standards Manual**

Abstract: This document provides the criteria for craftsmanship to be used in manufacturing and maintaining Digital products.

EL-00119-00 **DEC STD 119-0 Digital Product Safety - Introduction and General Requirements**

Abstract: Section 0 defines the intentions and criteria to be used during design and development of new products.

EL-00119-01 **DEC STD 119-1 Digital Product Safety - Design Criteria**

Abstract: Section 1 presents product safety design criteria.

EL-00119-02 **DEC STD 119-2 Digital Product Safety - Test Procedures**

Abstract: Section 2 presents test procedures required to determine whether products meet design criteria.

EL-00119-05 **DEC STD 119-5 Digital Product Safety - Process for Design, Evaluation, Testing, and Certification of Hardware Products to Product Safety Requirements**

Abstract: Section 5 specifies the process to be followed to ensure that Digital hardware products are designed to be safe, compliant with internal and external product safety standards, and able to be certified by outside agencies.

EL-00122-00 **DEC STD 122-0 AC Power Line Standards Design Requirements and Design Guidelines**

Abstract: Provides design requirements and guidelines for power supplies, power control equipment, and other devices that operate off primary ac power sources.

EL-00178-00 **DEC STD 178-0 Digital Marking Standard**

Abstract: Establishes the item marking requirements for identification of items produced by or for Digital.

EL-00264-00 **DEC STD 264-0 Field Return of Defective Material: Inspection Criteria and Visual Inspection Procedures**

Abstract: This standard establishes inspection criteria, methods, and procedures to be used by Digital Field Return/Repair Distribution Stockrooms. Defines criteria for determining if product should, or should not, be returned for repair.

EL-00265-00 **DEC STD 265-0 Module Rework and Repair - Standard Procedures**

Abstract: This standard establishes the standard module rework and repair methods and procedures to be used by manufacturing and the Field Service Module Repair Center.

EL-MF069-00 **Corrective Action Request Procedure**

EL-MF075-00 **Procedure for Processing Non-conforming Material and In-Process Waiver**

EL-MF096-00 **Acceptance Stamps - Use and Control Procedure**

EL-MF277-00 **Electrical Safety Product Test Procedure**

EL-MF300-00 **System Safety Grounding Procedure**

EL-MF326-00 **Manufacturing Systems Assessment Procedure - Introduction, Guidelines, and Instructions**

EL-MF328-00 **Engineering Specification - General Torque Requirements**

EL-MF342-00 **Test Requirements for Equipment Released from Z Stock**

EL-MF350-00 **Systems Manufacturing Final Product Audit Plan**

EL-MF378-00 **Quality Audit Procedure: Systems Manufacturing Functional Product Audit-Plan**

4.8 SUBCONTRACTING

The use of subcontractors to supplement Digital's manufacturing capacity has increased dramatically in recent years because of market demand for our product and the need for greater cost effective use of our capital resources.

It should be emphasized that the PPS/R Coordinator must play an active role in the subcontracting process to ensure that all requirements and programs necessary for a safe, compliant product are met by the subcontractor.

EL-MF416-00 **Manufacturing Subcontracts Management Policy**

Abstract: This policy states the general requirements for Digital Equipment Corporation subcontracting, and lists the different operational functions and responsibilities impacting the subcontract decision.

ASQC C1-1968 **Specification of General Requirements for a Quality Program**

Abstract: This standard provides a brief summary of each of the general requirements necessary for a successful Quality Program. It relates directly to contractors both internal and external to Digital. Covered are requirements on quality management, design information, procurement, material control, manufacturing, product acceptance, measuring instruments, quality information, corrective action and audits.

ASQC **How to Establish Effective Quality Control for the Small Supplier**

Abstract: This document is a useful guide in establishing a workable, cost effective quality control system for small subcontractors. In addition, it lays the ground work for an effective interface between the Digital plant and its subcontractors. Covered are interpreting and reviewing product requirements; the quality control manual; receiving in-process and final inspection; measuring and test equipment; documentation and traceability; training; equipment certification; handling nonconforming material; planning for customer quality survey; and planning for source inspection.

ASQC **How to Conduct a Supplier Survey**

Abstract: This is an easy-to-read, concise document outlining key features of the supplier survey process. It has definite applicability to Digital subcontracting. Covered in sequence are: preparation for the survey, survey team organization, use of quantification in the evaluation format, the opening conference, what to look for in the quality program, how to gain the most from a plant tour, evaluation of a record system, closing conference and final report. Also covered are survey follow-up, post survey team critique, international- foreign suppliers and a brief summary.

ASQC **How to Evaluate a Supplier's Product**

Abstract: This guide describes some of the more commonly used methods of evaluating purchased products. Using these concepts will enable Digital plants to develop operating procedures that will maintain an ongoing program for evaluating subcontractors' product performance. Covered are the following topics: pre-award conference, initial production, incoming inspection, source inspection, using vendor data, nonconforming product, and performance evaluation.

EL-00005-01 **DEC STD 005-1 In-Plant Product Hold Procedure**

Abstract: This section of DEC STD 005 describes the procedure for placing a product on hold, removing a product hold, and various communications requirements.

Comments: Regarding product/regulatory product deficiencies, the PPS/R Coordinator may require that a product-hold be implemented in a subcontractor's plant. The procedure agreed upon by Digital and the subcontractor should parallel the requirements of Section 1 of this standard to the extent possible.

EL-00031-00 **DEC STD 031-0 Product Serialization**

Abstract: This standard defines the requirements for product serialization and provides a uniform serial numbering scheme and format for Digital products. Covered are content, application and location of the serial label/tag.

Comments: Subcontractors are usually assigned serial numbers in blocks by the DEC subcontracting plants. All label/tag information is controlled from the DEC subcontracting plant.

EL-00103-01 **DEC STD 103-1 FCC Labeling and User Manual Information**

Abstract: Section 1 provides an overview of the process for labeling equipment and modifying user manuals in response to FCC regulations cited in FCC Rules Part 15.J.

EL-00103-1A **DEC STD 103-1A FCC Labeling and User Manual Information**

Abstract: Section 1A describes the policy for labeling applicable Digital equipment that has not been verified or certified as complying with FCC regulations cited in FCC Rules, Part 15.J. This section of the standard will be voided by 10/1/83, after which all applicable product must be in compliance.

Comments: Other sections of those standards are pending. They are: Section 1B, FCC Verification Labeling, Section 1C, FCC User Information, and Section 1D, Approval Process for FCC EMI Verification.

EL-00116-00 **DEC STD 116-0 Workmanship Standards Manual**

Abstract: This standard provides the criteria for craftsmanship to be used in manufacturing and maintaining Digital Products.

Comments: Subcontractors must be in compliance with this standard. Additional requirements may be specified by UL/CSA.

EL-00156-00 **DEC STD 156-0 Introducing New Purchased Parts and Maintaining Purchased Parts Information: Standard Procedures**

Abstract: This standard defines the process for introducing a purchased part into the Purchased Specification System (PSIS) and also describes the process in place to maintain the correctness of all purchased part information.

Comments: This is a useful standard to review, particularly subheads 2.9.2, Identification of an IPP Part; 2.9.5, Removal of IPP Status; and 5.1.2, New Part Introduction Responsibilities.

EL-MF069-00 **Corrective Action Request Procedure**

Abstract: This procedure relates to the process for nonconforming products where a Digital plant receiving the product requires corrective action from the supplying plant or from the applicable product design group. Included are the corrective action responsibilities, forms, and time schedules for completion dependent on the degree of defect severity.

EL-MF075-00 **Procedure for Processing Nonconforming Material and Inprocess Waiver**

Abstract: This specification defines the procedure to be used when Digital receives nonconforming product from its vendor or subcontractor. Covered are the decision modes which can be applied, such as RTV, rework by Digital, 100% sort, scrap, and waiver. The procedure for use of the nonconforming Material/Waiver Form and the Nonconforming Material Tags are detailed. Also described is the Vendor Corrective Action Request Form.

EL-MF096-00 **Acceptance Stamps - Use and Control Procedure**

Abstract: This specification details the use and control procedures for acceptance stamps assigned to subcontractors by Digital. It applies to all of Digital's marketable products including those built/assembled/repaired by subcontractors. Also described in this specification are the various stamp, configurations, marking and the locations on the various types of products/assemblies where the acceptance stamps must be placed.

EL-MF277-00 **Electrical Safety Product Test Procedure**

Abstract: This specification describes the requirements and procedures for Ground Continuity and Dielectric Withstand (HIPOT) Tests performed to verify the electrical safety of Digital's finished products.

Comments: To be used only by UL/CSA certified subcontractors. Product from non-UL/CSA certified subcontractors must be tested on the approved UL/CSA certified DEC location.

These tests are mandatory for all Prime powered (voltages in excess of 42.2 VAC, 30V ms) products.

- 100% of production.

EL-MF345-00 **Supplier Quality Survey**

Abstract: Sections 0 through 7 contain all the necessary forms, check lists, and procedures to obtain sufficient information to determine whether or not a particular vendor/subcontractor has the potential to provide Digital with a quality product. These specifications may be used for:

Initial Surveys
Follow-up Surveys
Audits

Covered in these specifications are:

Section 0 - Introduction

Section 1 - Preliminary Purchasing Survey

Section 2 - General Information

Section 3 - Quality Survey - General

Section 4 - Castings Quality Survey

Section 5 - Plating/Conversion Coating Quality Survey

Section 6 - Organic Coating Quality Survey

Section 7 - Plastics Quality Survey

EL-MF373-00 **Source Inspection - Policy and Procedure**

Abstract: This specification defines the policy and procedures that govern inspection at the vendor/subcontractor site (source inspection) by Digital or contract inspectors of vendor-supplied material/product. It provides guidance on when to choose source inspection as a vendor material/product acceptance tool. Digital and vendor required actions are stated. Scheduling of source inspections and other coordination are also covered.

4.9 PRINTED-WIRING BOARDS

UL Listed or Recognized and CSA Certified products manufactured by Digital contain printed-wiring boards that are required to meet design criteria specified by these agencies. Refer to the following documents for information pertaining to these requirements.

EL-00030-00 **DEC STD 030-0 Module Manufacturing Standard**

Abstract: This standard describes the module manufacturing capability of Digital and the circuit layout standards and procedures which allow that capability to be optimized. It contains all the rules that ensure the Design Engineer a fast and economical module, and assures the Product Line Manager volume deliveries during the production life of his or her product.

Comments: DEC STD 030 contains the design and safety criteria for printed-wiring boards used in Digital's products.

EL-00060-00 **DEC STD 060-0 Design and Certification of Hardware Products to National and International Regulations and Standards**

Abstract: Defines the intentions, responsibilities, and controls for designing and certifying Digital hardware products to meet the requirements of nationally and internationally recognized organizations.

EL-00060-01 **DEC STD 060-1 Design and Certification of Hardware Products to National and International Regulations and Standards - Specific Requirements**

Abstract: Section 1 lists the specific Digital Standards and external regulations and standards that apply to Digital's hardware product designs. It also lists requirements that have been investigated and found to be not applicable to Digital's hardware product designs.

Comments: Together, DEC STD 060 and DEC STD 062 comprise Digital's Product Safety Policy standard.

EL-00062-00 **DEC STD 062-0 Product Submittal to U.S. and Foreign Agencies**

Abstract: This standard defines the various agencies around the world to which our products must be submitted. It also identifies Digital personnel in various countries who submit our products to these agencies, the submittal procedures, and legally-mandated labeling procedures.

Comments: Together, DEC STD 060 and DEC STD 062 comprise Digital's Product Safety Policy standard.

EL-00119-00 **DEC STD 119-0 Digital Product Safety - Introduction and General Requirements**

Abstract: Section 0 defines the intentions and criteria to be used during design and development of new products.

EL-00119-01 **DEC STD 119-1 Digital Product Safety - Design Criteria**

Abstract: Section 1 presents product safety design criteria.

EL-00119-02 **DEC STD 119-2 Digital Product Safety - Test Procedures**

Abstract: Section 2 presents test procedures required to determine whether products meet design criteria.

EL-00119-05 **DEC STD 119-5 Digital Product Safety - Process for Design, Evaluation, Testing, and Certification of Hardware Products to Product Safety Requirements**

Abstract: Section 5 specifies the process to be followed to ensure that Digital hardware products are designed to be safe, compliant with internal and external product safety standards, and able to be certified by outside agencies.

EL-00176-00 **DEC STD 176-0 Printed-Wiring Board Acceptance Criteria**

Abstract: This standard specifies end-product criteria for rigid printed-wiring boards that have been fabricated or purchased for Digital.

Comments: This standard specifies the acceptance requirements for printed-wiring boards used by Digital in its products.

UL 478 **Standard for Electronic Data-Processing Units and Systems**

Abstract: The requirements in this standard cover electrically operated units that, separately or assembled in systems, electronically accumulate, process, and store data. Acceptance and divulgence of data may or may not be by electronic means.

These requirements cover units intended for permanent or cord connection to 600 V or lower potential branch circuits. The branch circuits and the means of supplying the units from them are intended to comply with the National Electrical Code, ANSI/NFPA 70. Each unit is intended for installation in accordance with the Standard for the Protection of Electronic Computer/Data Processing Equipment, ANSI/NFPA 75.

Comments: Printed-wiring boards and printed-wiring assemblies, as described in the glossary of this standard, are addressed in several requirements of this standard. The requirements of this standard are included in DEC STD 119.

UL 796 **Standard for Printed-Wiring Boards**

The requirements for this standard apply to printed-wiring boards for use as components in devices or appliances. Compliance of a printed-wiring board with these requirements does not indicate that the board is acceptable for use as an end product without further investigation.

Acceptance of a component printed-wiring board in a device or applince depends upon the acceptability of the board for continued use under the conditions that prevail in service and the requirements for use in an end product apply.

CSA C22.2 **Data Processing Equipment**

No. 154-M1983

Abstract: This standard applies to data processing equipment intended to be connected to supply circuits with a nominal system voltage of 600 and less, for use in ordinary locations in accordance with Canadian Electrical Code, Part I.

4.10 CABLE AND HARNESSES

This section provides information on the documents that pertain to cables and harnesses.

EL-00002-00 **DEC STD 002-0 AC Power Wiring, Safety Grounding, Receptacle and Electrical Rating Information Requirements**

Abstract: This standard defines requirements for ac power wiring and grounding. It specifies the types of outlets, power cords and plugs, and electrical rating information to be used on Digital's hardware products.

Comments: This standard is important because it pertains to wire sizes, ampacity, color coding, marking connection methods, and strain relief. It also discusses workmanship criteria.

EL-00005-00 **DEC STD 005-0 Operational Alert (OPAL) Procedure**

Abstract: Describes how an Operational Alert (OPAL) message is authorized and issued to alert the corporation of a product that has a safety defect or a serious functional defect.

EL-00005-01 **DEC STD 005-1 In-Plant Product Hold Procedure**

Abstract: Describes the procedure for placing a product on hold, removing a product hold, and various communication requirements.

Comments: Regarding product safety/regulatory product deficiencies, the PPS/R Coordinator may require that a product hold be implemented in a subcontractor's plant. The procedure agreed upon by Digital and the subcontractor should parallel the requirements of Section 1 of this standard to the extent possible.

EL-00005-02 **DEC STD 005-2 Hardware Products Non-Compliant with Digital Standards**

Abstract: This section describes the required procedure for reporting hardware products that do not comply with DEC STD 002, 052, 053, 060, 102, 103, 119, 122, or other applicable hardware design standards. Special procedures for stopping shipment of such products are described in Section 0 and 1 of this standard.

EL-00043-00 **DEC STD 043-0 Corporate Supplier Packaging Standard**

Abstract: Describes Digital's material handling and packaging requirements in terms of cartons and pallets, and their size, weight, labeling, and environmental protection as they apply to shipments from suppliers and between plants.

EL-00043-01 **DEC STD 043-1 Corporate Supplier Packaging Standard - Sheet, Blanks, or Coils of Steel or aluminum**

Abstract: Specifies Digital's requirements for the packaging of steel and aluminum sheet, blanks, and coils.

Comments: Only Section 0 may apply.

EL-00047-00 **DEC STD 047-0 Bar Code Symbology**

Abstract: Provides guidelines for the uniform application of bar code symbology. Use of bar code labels on products, modules, subassemblies, units, and related packaging materials is defined. Specific formatting details are described, as are the guidelines for use of labels in product traceability and inventory control.

Comments: Traceability of DEC products is an essential product safety concern.

EL-00055-00 **DEC STD 055-0 Purchase Specifications: Guidelines**

Abstract: Establishes the general instructions and responsibilities for the preparation and control of Digital Purchase Specifications.

Comments: Awareness of component purchase specification activity is an asset to a Plant Product Safety and Regulations Coordinator. Pay particular attention to component class general purchase specifications.

EL-00059-00 **DEC STD 059-0 Incoming Inspection Procedures: General Policy**

Abstract: Establishes the general policy regarding requirements and responsibilities for Incoming Inspection Procedures.

EL-00059-01 **DEC STD 059-1 PAVES Incoming Inspection Documentation Requirements**

Abstract: Describes requirements for the Incoming Inspection documentation on the Part Analysis Vendor Evaluation System (PAVES).

EL-00059-02 **DEC STD 059-2 Incoming Inspection Procedures - Metal Fabrication and Plastics**

Abstract: Establishes a uniform method for generating, controlling, and distributing Incoming Inspection Procedures (II's) for metal fabrication and plastics.

EL-00059-03 **DEC STD 059-3 Incoming Inspection: Standard Operating Procedures**

Abstract: Establishes the minimum requirements for documenting standard operating procedures for Incoming Inspection areas. Defines flow of materials and forms, methods of identification and traceability, methods to control measuring equipment, and the required quality documentation for Incoming Inspection areas.

Comments: Incoming Inspection Departments are a key element in maintaining component compliance to product safety criteria. (Be aware of implication of DEC's "Ship to Stock" program.)

EL-00060-00 **DEC STD 060-0 Design and Certification of Hardware Products to National and International Regulations and Standards**

Abstract: Defines the intentions, responsibilities and controls for designing and certifying Digital hardware products to meet the requirements of nationally and internationally recognized organizations.

EL-00060-01 **DEC STD 060-1 Design and Certification of Hardware Products to National and International Regulations and Standards - Specific Requirements**

Abstract: Lists the specific Digital standards and external regulations and standards that apply to Digital's hardware product designs. It also lists requirements that have been investigated and found to be inapplicable to Digital's hardware product designs.

Comments: This standard establishes DEC's product safety program and which world wide product safety standards DEC has adopted.

EL-00100-00 **DEC STD 100-0 Engineering Change Orders**

Abstract: Pertains to a unified procedure for submission of Engineering Change Orders. All engineering drawings and documentation filed in Engineering Document Control Centers can only be changed by the procedures outlined herein. ECOs are controlled and issued by the Engineering Services groups within Engineering.

EL-000100-01 **DEC STD 100-1 Engineering Change Orders - Hardware**

Abstract: Describes the policies, procedures, and guidelines used to create ECOs for Digital hardware. It also specifies the responsibilities and roles assigned to the various individuals and organizations that create, administer, and implement them.

EL-00100-1A **DEC STD 100-1A Engineering Change Orders (ECO) - Engineering ECO Coordination Procedure**

Abstract: Defines the procedure used by an Engineering ECO Coordinator to support the ECO process for Digital hardware. The procedure for the overall process is given, together with a method of handling supplement ECOs and for validating or assisting in determining which engineers are responsible for a specific ECO process.

EL-00100-1B **DEC STD 100-1B Hardware ECO Form Procedure**

Abstract: Defines procedure for filling out ECO the face-sheet and associated forms required for hardware ECO.

EL-00100-1C **DEC STD 100-1C Engineering Change Orders (ECO - Financing ECOs to Hardware)**

Abstract: Describes the policy and procedure for financing ECOs to hardware.

EL-00100-02 **DEC STD 100-2 Engineering Change Orders - Purchase Specifications**

Describes the policy and procedure for changing purchase specifications. Also specifies responsibilities and roles assigned to various organizations involved in the purchase specification ECO process.

EL-00100-03 **DEC STD 103-0 Diagnostic Engineering Change Orders and Patch Orders (DECOs and DEPOs)**

Abstract: Describes the policies and procedures for the administration and control of diagnostic engineering change orders, patch orders, and submissions of new diagnostic products to the Software Distribution Center.

EL-00101-00 **DEC STD 101-0 Manufacturing Operations Plan for Assembly, Inspection, and Test: Policy and Requirements**

Abstract: Presents a policy for the structure of a Manufacturing Operations Plan for all product lines and businesses within Digital Equipment Corporation. This Manufacturing Operations Plan allows product lines and businesses the flexibility to assure that controls are implemented so all products are products in conformance to specifications.

Comments: Verification of product safety compliance should be in harmony with the manufacturing operation requirements of this standard.

EL-00116-00 **DEC STD 116-0 Workmanship Standards Manual**

Abstract: This document provides the criteria for craftsmanship to be used in manufacturing and maintaining Digital Products.

Comments: Quality workmanship is an integral part of product safety.

EL-00119-00 **DEC STD 119-0 Digital Product Safety - Introduction and General Requirements**

Abstract: Defines the intentions and criteria to be used during design and development of new products.

EL-00119-01 **DEC STD 119-1 Digital Product Safety - Design Criteria**

Abstract: Presents product safety design criteria

EL-00119-02 **DEC STD 119-2 Digital Product Safety - Test Procedures**

Abstract: Presents test procedures required to determine if products meet design criteria.

EL-00119-05 **DEC STD 119-5 Process for Design, Evaluation, Testing, and Certification of Hardware Products to Product Safety Requirements**

Abstract: This section specifies the process to be followed to ensure that Digital hardware products are designed to be safe, compliant with internal and external product safety standards, and able to be certified by outside agencies.

EL-00122-00 **DEC STD 122-0 Cable and Harness Documentation: Part Identification Requirements**

Abstract: Defines the part and numbering system for cable and harnesses.

EL-00122-01 **DEC STD 122-1 Cable and Harness Documentation: Drawing Requirements**

Abstract: Defines the drawing requirements for cable and harness design/assembly documentation.

EL-00178-00 **DEC STD 178-0 Digital Marking Standard**

Abstract: Establishes the item marking requirements for identification of items produced by or for Digital Equipment Corporation.

Comments: Marking criteria is reasonably well defined within this standard and amplifies and/or supports product safety marking requirements in other standards.

EL-00264-00 **DEC STD 264-0 Field Return of Defective Material: Inspection Criteria and Visual Inspection Procedure**

Abstract: This standard establishes the inspection criteria, methods, and procedures to be used by the Digital Field Return/Repair Distribution Stockrooms. It helps other organizations determine what products should or should not be returned for repair.

Comments: This standard is a good reference document for disposition of returned material.

EL-MF069-00 **Corrective Action Request Procedure**

Abstract: This procedure relates to an internal Digital produced non-conformance product where a Digital plant receiving this product requires corrective action from the supplying plant or from the applicable product design group. Included are corrective action responsibility forms and time schedules for completion dependent on the degree of defect.

EL-MF075-00 **Procedure for Processing Non-Conforming Material and In-Process Waiver**

Abstract: This specification defines the procedure to be used when Digital received nonconforming product from its vendor or subcontractor. Covered are the decision modes which can be applied, such as RTV, rework by Digital, 100% sort, scrap, and waiver. The procedure for use of the Nonconforming Material/Waiver Form and the Nonconforming Material Tag are detailed. Also described is the Vendor Corrective Action Request Form.

EL-MF096-00 **Acceptance Stamps - Use and Control Procedure**

Abstract: This specification details the use and control procedures for acceptance stamps assigned to subcontractors by Digital. It applies to all of Digital's marketable products including those built/assembled/repaired by subcontractors. Also described in this specification are the various stamp configurations, marking and the locations on the various types of products/assemblies where the acceptance stamp must be placed.

EL-MF111-00 **Cable Location Labeling**

Abstract: This specification provides guidelines for labeling the ends of both ribbon and round cables, to assist others in the task of properly mating cables and equipment.

Comments: This procedure applies to the product application of the cable or harness. The label in this procedure may or may not be required to be applied during manufacture of the cable/harness assembly.

EL-MF260-00 **Selection and Specification - Guideline for Connectors/Interconnecting Components**

Abstract: This document is intended to act as a guideline in the selection and/or specification of connectors and interconnection components presently available. This guideline is not all inclusive, however, the information contained herein represents the "common denominator" parameters for selecting or specifying interconnection components.

Comments: The contents include: Information Sources, Approval Agencies, Introduction, Terms and Definitions, General Characteristics Reliability Considerations, Housing Materials, Contact Materials and Plating, Selection and Specification Checklist.

EL-MF267-00 **Solderless Crimped Terminations - Controls and Procedures**

Abstract: This specification covers general and specific information on crimp style, (solderless), terminations covering general terminal descriptions, equipment, calibration, inprocess controls and criteria to determine acceptable crimped terminations.

EL-MF277-00 **Electrical Safety Product Test Procedure**

Abstract: This Specification describes the requirements and procedures for Ground continuity and Dielectric Withstand (HIPOT) Tests performed to verify the electrical safety of Digital's finished products.

Comments: To be used only by UL/CSA certified subcontractors. Product from non UL/CSA certified subcontractors must be tested in the approved UL/CSA certified DEC location.

Normally tests are MANDATORY* for all prime powered (voltages in excess of 42.4 VAC, 30V rms) products.

*100% of production
Exceptions covered in UL764 Table L1 (pg 6) and Paragraph L18 (pg 9).

EL-MF332-00 **Repair Procedure for Wire Insulation and/or Conductor Damage**

EL-MF339-00 **Cable/Harness Assembly Process Handbook**

EL-MF343-00 **Cable and Harness Identification Labels: Criteria and Application Methods**

Abstract: This specification states the requirements and methods of application for cable and harness ID labels.

Comments: This procedure identifies the preferred labels for cables and harnesses. The labeling described in this procedure is required on all cables and harness to meet traceability requirements.

EL-MF345-00 **Section 0-7, Supplier Quality Survey**

Abstract: This is a series of specifications which contains all of the necessary forms, check lists and procedures to obtain sufficient information to determine whether or not a particular vendor/subcontractor has the POTENTIAL to provide Digital with quality products. These specifications may be used for:

- Initial Surveys
- Follow-Up Surveys
- Audits

Covered in these specifications are:

- Section, Introduction
- Section 1, Preliminary Purchasing Survey
- Section 2, General Information
- Section 3, Quality Survey - General
- Section 4, Castings Quality Survey
- Section 5, Plating/Conversion Coating Quality Survey
- Section 6, Organic Coating Quality Survey
- Section 7, Plastics Quality Survey

EL-MF373-00 **Source Inspection - Policy and Procedures**

Abstract: This specification defines Digital's policies and procedures governing source inspections, performed either by Digital or Digital-contract inspectors, at the site of the vendor/subcontractor. It provides guidelines for scheduling and using source inspections as a tool for evaluating vendors' materials or products. The responsibilities of Digital and those of the vendors are addressed in this specification.

UL **Wiring Harnesses**

Abstract: This is an informal overview of the UL Wiring Harness Listing Program. The major sections are:

- Introduction/Purpose
- Definition of Wiring Harness
- Operation of the Program
- UL Listing Marks
- General

UL764 **Wiring Harnesses, Follow-Up and Inspection Instructions**

Abstract: This is a comprehensive UL procedure which describes the requirements and responsibilities for the conduct of its wiring harness certification program. Covered in detail is the:

- Manufacturer's Program

  Follow-Up Control Requirements
  Sampling of Product
  Testing
- UL Inspector's Program

  Visual/Testing Requirements
  Test Audit
  Sampling of Product
- General - Marking

CSA **Use of CSA Certified Quick-Connect Terminals with One or Two Standard Copper Conductors in Sizes #22-10 AWG**

Abstract: This is a bulletin which announces a revision to the above standard effective 10/31/83. Standard on Quick Connect Terminals has been revised to include the use of one or two standard copper conductors in size #22-10 AWG. After 10/31/83 wiring harnesses may not be manufactured with multiple wire connections unless the quick connect terminals are CSA certified for such use.

ASQC STD C1-1968 **(American Society for Quality Control) General Requirements for a Quality Program**

Abstract: This standard provides a brief summary of each of the general requirements necessary for a successful Quality Program. This standard relates directly to contractors both internal and external to Digital. Covered are requirements on Quality Management Design Information, Procurement, Material Control; Manufacturing, Product Acceptance, Measuring Tools, Quality Information, Corrective Action and Audits.

ASQC **How to Evaluate a Supplier's Product**

Abstract: This guide describes some of the more commonly used methods of evaluating purchased products. These concepts will enable Digital plants to develop operating procedures that will maintain an ongoing program for evaluating subcontractors product performance. Covered are the following topics, Pre-award Conference, Initial Production, Incoming Inspection, Source Inspection, Utilizing Vendor Data, Non-Conforming Product, and Performance Evaluation.

ASQC **How to Conduct a Supplier Survey**

Abstract: This is an easy to read, concise document outlining key features of the supplier survey process. It has definite applicability to Digital subcontractors. Covered in sequence are, Preparation for the Survey, Survey Team Organization, Use of Quantification in the Evaluation Format, How to Gain the Most from a plant Tour, Evaluation of a Record System, Closing Conference and Final Report.

ASQC **How to Establish Effective QC for the Small Supplier**

Abstract: This document is intended to serve as a useful guide in establishing a workable, cost effective, quality control system for small subcontractors. In addition, it lays the ground work for an effective interface between the Digital plant and its subcontractors. Covered are Interpreting and Reviewing Product Requirements; the Quality Control Manual; Receiving in Process and Final Inspection; Inspection Measurement and Test Equipment; Documentation and Traceablity; Drawing; Equipment Certification; handling non-conforming material; Planning for customer Quality Survey and Planning for Source Inspection.

CHAPTER 5

FINANCIAL TOPICS

This chapter presents an overview of the financial considerations that arise during approval and follow-up procedures. The dollar figures specified reflect current charges and may change at any time. The CSA costs are reported in Canadian dollars.

5.1 UL CHARGES

Engineering Product Safety Groups are responsible for contacting UL for product certification and approval and for generating a Follow-Up Procedure. This normally occurs in Phase 2 of the Phase Review Process. See DEC STD 119-5 and DEC STD 028-0, Phase Review Policy. The charges incurred to generate the Follow-Up Procedure for a new product are born by Engineering.

Manufacturing receives a copy of the Follow-Up Procedure as soon as UL generates it, provided the manufacturing plant is identified as a builder of the specific product. Information on all the products that a UL inspector may see in one manufacturing plant is collected into a numbered volume.

The average cost per visit by a UL inspector to a specific manufacturing plant is approximately $185.00. These and any additional charges generated when there are changes to the UL procedure are paid for by the MPS&R Group. The average cost per change request is approximately $120.00. Additional charges may be incurred if the plant is under the wire and harness follow-up contract.

5.2 CSA CATEGORY CERTIFICATION CHARGES

CSA requires a manufacturing plant to pay an initial Escrow charge of $1000.00 (in Canadian currency) at the time that a manufacturing plant submits an application for category certification. This amount is refundable upon closing of the plant.

The actual cost of inspection visits is billed to the specific manufacturing facility by CSA. The average cost is approximately $800.00 per visit, depending on travel requirements. For facilities outside the U.S. or Canada, CSA makes use of local agencies to represent them at some of the plant visits.

An annual sustaining fee of $100.00 per year is also charged to the plant for maintenance of its Blue Book listing.

5.3 CSA PRODUCT CERTIFICATION CHARGES

The initial cost incurred for CSA product certification averages $1000.00. CSA also charges an annual inspection fee based on the number of visits to the manufacturing plant. This fee has averaged approximately $370.00 per plant. In addition, change requests to CSA certified products are charged at the rate of $250.00 per change.

Currently, these CSA charges are billed to the appropriate manufacturing plants.

5.4 CAPTURING MANUFACTURING CHARGE DATA

In order to properly asses the costs incurred by our Product Safety efforts, Plant Product Safety Coordinators should maintain records for themselves and for MPS&R detailing the costs that lie in their domains. Examples of these costs include:

- Cost of labels (UL/CSA, safety labels, and others)
- Cost of special equipment required to perform safety testing or meet safety requirements (HI-POT tester, torque tools, and others)
- Record retention costs (maintenance of files, documents, serial numbers, and others)
- Expenses incurred in the periodic visits of outside inspectors, since in many cases the travel expenses of the inspectors are shared by more than one plant
- The cost incurred during emergency situations (product hold, defective material at incoming inspection, evaluation costs, and others)
- The costs incurred in safety ECOs required by the plants, the Groups, Engineering, outside agencies, Field Service, and others. The way these costs are apportioned depends on the phase status of the product and other considerations specified in DEC STD 100.

CHAPTER 6

ENGINEERING-TO-MANUFACTURING TELECOMMUNICATION PRODUCT AGENCY APPROVAL HANDOFF

This chapter describes the procedure to be followed for the formal telecommunication product handoff from Engineering to Manufacturing.

6.1 PREREQUISTITES FOR TELECOMMUNICATION PRODUCTS HANDOFF

Determine if the product is indeed a telecommunication product by asking the following questions.

a. Does the product contain a modem? If so, is it a separate option to the product?

b. Does the product contain an embedded modem?

c. Does the product contain a RS-232-C with comparable V.24 or V.28 interface?

If yes is the answer to one or all of the questions above, the product fits the telecommunication category.

6.2 TELECOMMUNICATION INFORMATION

The product file shall contain all country-specific regulatory approval information such as FCC license numbers, Germany FTZ numbers, Canadian Department of Communication license numbers. In addition, the product file shall contain all PTT and United Kingdom agency approval numbers. Also, the file shall contain all labeling information which shall conform to DEC STD 178-3.

All products that require FCC rule part 68 certification or the Canadian Department of Communication approval shall have the test results of this activity as part of the product file.

6.3 CONTROLLED COMPONENTS

A controlled/critical component in telecommunication equipment is any component that can affect the state of the signal being applied to the public or private switched network. A list of controlled/critical components shall be part of the product file. This list shall be a separate list or a part of the BOM. Engineering is responsible to supply this information.

6.4 SUPPORT

Engineering shall provide support of the telecommunication option or product throughout the agency approval process. As well, Engineering shall provide support for telecommunication products after the introduction of the product to Manufacturing.

6.5 AGENCY PLANT INSPECTIONS

At this time there are no telecommunication regulatory agency plant inspections. It would be prudent, however, for the Plant Product Safety Coordinator to establish a product file with all regulatory related product specific documentation in anticipation of such agency inspections.

APPENDIX A

REFERENCED DOCUMENTS

A.1 DIGITAL STANDARDS

EL Number	Document Title
EL-00002-00	*DEC STD 002-0 Ac Power Wiring, Safety Grounding, Receptacle and Electrical Rating Information Requirements.*
EL-00005-00	*DEC STD 005-0 Operational Alert (OPAL) Procedure*
EL-00022-00	*DEC STD 022-0 Cable and Harness Documentation*
EL-00028-00	*DEC STD 028-0 Phase Review Policy*
EL-00030-00	*DEC STD 030-0 Module Manufacturing Standard*
EL-00031-00	*DEC STD 031-0 Product Serialization*
EL-00043-00	*DEC STD 043-0 Corporate Supplier Packaging Standard*
EL-00047-00	*DEC STD 047-0 Bar Code Symbology - Guidelines*
EL-00055-00	*DEC STD 055-0 Purchase Specifications: Guidelines*
EL-00056-00	*DEC STD 056-0 Logic Symbology - Circuit Schematic Requirements*
EL-00059-00	*DEC STD 059-0 Incoming Inspection Procedures: General Policy*
EL-00060-00	*DEC STD 060-0 Design and Certification of Hardware Products to National and International Regulations and Standards*
EL-00062-00	*DEC STD 062-0 Product Submittal to U.S. and Foreign Agencies*
EL-00064-00	*DEC STD 064-0 Compliance with International Language Requirements*
EL-00100-00	*DEC STD 100-0 Engineering Change Orders*
EL-00101-00	*DEC STD 101-0 Manufacturing Operations Plan for Assembly, Inspection, and Test: Policy and Requirements*
EL-00102-00	*DEC STD 102-0 Environmental Standard for Computers and Peripherals - General Test Requirements*
EL-00103-00	*DEC STD 103-0 Electromagnetic Compatibility (EMC) Hardware Design Requirements*
EL-00106-00	*DEC STD 106-0 Standard for In-House Acceptance Procedures*
EL-00112-00	*DEC STD 112-0 Standard Data Format for Output*
EL-00115-00	*DEC STD 115-0 Manufacturing Plant Documentation (MPD)*
EL-00116-00	*DEC STD 116-0 workmanship Standards Manual*
EL-00119-00	*DEC STD 119-0 Digital Product Safety - Introduction and General Requirements*
EL-00122-00	*DEC STD 122-0 AC Power Line Standards: Design Requirements and Design Guidelines*
EL-00128-00	*DEC STD 128-0 Confidential Engineering Information and Documentation: Policy and Requirements*
EL-00132-01	*DEC STD 132-1 Digital Field Service Product Safety Policies and Procedures Manual - Reporting Alleged Product Safety Incidents*
EL-00132-02	*DEC STD 132-2 Digital Field Service Product Safety Policies and Procedures Manual - Pre-Investigation of Alleged Product Safety Incidents*

EL Number	Document Title
EL-00156-00	*DEC STD 156-0 Introducing New Purchased Parts and Maintaining Purchased Parts Information: Standard Procedures*
EL-00176-00	*DEC STD 176-0 Printed-Wiring Board Acceptance Criteria*
EL-00178-00	*DEC STD 178-0 Digital marking Standard*
EL-00264-00	*DEC STD 264-0 Field Return of Defective Material: Inspection Criteria and Visual Inspection Procedures*
EL-00265-00	*DEC STD 265-0 Module Rework and Repair - Standard Procedures*

A.2 DIGITAL SPECIFICATIONS

Document Number	Document Title
76-65029	*Procedure for Identifying Multiple Use Boards Without Handles*
76-65069-00	*Corrective Action Request Procedure*
76-65075-00	*Procedure for Processing Non-Conforming Material and In-Process Waiver*
EL-MF096-00	*Acceptance Stamps - Use and Control Procedure*
76-65111-00	*Cable Location Labeling*
EL-MF277-00	*Electrical Safety Product Test Procedure*
76-65260-00	*"Selection and Specification" - Guideline for Connectors/Interconnecting Components*
76-65287-00	*Format Procedure for Writing Engineering Specifications*
EL-MF300-00	*System Safety Grounding Procedure*
76-65314-00	*"PAVES" - Instructions for completing "Transfer and Flow Form"*
76-65326-00	*Manufacturing Systems Assessment Procedure - Introduction, Guidelines, and Instructions*
76-65328-00	*Engineering Specification - General Torque Requirements*
76-65342-00	*Test Requirements for Equipment Released from Z Stock*
76-65345-00	*Supplier Quality Survey*
76-65350-00	*Systems Manufacturing Final Audit Plan*
76-65373-00	*Source Inspection - Policy and Procedures*
76-65378-00	*Quality Audit Procedure: Systems Manufacturing Functional Product Audit-Plan*
EL-MF416-00	*Manufacturing Subcontracts Management Policy*
EL-MF453-00	*Agency Change Request Procedure*

A.3 OTHER DOCUMENTS

Document Number	Document Title
EL-INDEX-00	*EL and 7665 Class Documents Index*
EC244417	*Corporate Field Service Product Safety Incident Reporting Procedure*
	Product Safety Change Request Procedure (UL/CSA Change Request Procedure)
	Option Module List
	Qualified Vendor List (QVL)
UL	*Testing for Public Safety*
UL	*Method of Development Revision and Implementation of Underwriters Laboratories Standards for Safety*
UL	*Listing and Follow-up Service Agreement*
UL	*Working Together*
UL	*Recognized Component Directory Latest Annual Revision*
UL478	*Standard for Electronic Data Processing Units and Systems*
UL764	*Wiring Harnesses, Follow-up and Inspection Instructions*
UL796	*Standard for Printed-Wiring Boards*
CSA 22.2 Number 154	*Data Processing Equipment*
CSA	*Certification Division - Policies and Procedures*
CSA	*Application and Record Group - How to Apply for CSA Certification*
CSA	*Certification Division - Why Certification?*
CSA	*Service Agreement*
CSA	*Questionnaire for Category Certification Programs*
CSA	*List of Certified Electrical Equipment (a.k.a. Blue Book, three volumes)*
ASQC	*Specification of General Requirements for a Quality Program*
ASQC	*How to Establish Effective Quality Control for the Small Supplier*
ASQC	*How to Conduct a Supplier Survey*
ASQC	*How to Evaluate a Supplier's Product*

Copies of Digital Standards and Specifications are available from

Standards and Methods Control

LJO1/I2, DTN: 226-2482, JOKUR::SMC

Please provide your name, mailstop, cost center, badge number and ENET node.

The Option/Module List is available from the Chief Engineer's Office

PKO3-2/H10, DTN: 223-6697

Copies of UL standards can be obtained from

UL, Publications Stock

333 Pfingsten Road,

Northbrook, IL 60062

Tel: 312-272-8800, Ext. 2612 or 2622

Copies of CSA standards can be obtained from

Canadian Standards Association
Standards Sales
178 Rexdale Blvd.,
Rexdale, Ontario, Canada M9W1R3
Tel: 416-747-4000

Copies of ASQC documents can be obtained from

American Society for Quality Control
230 West Wells Street
Milwaukee, Wisconsin 53203

GLOSSARY

This glossary contains words and phrases that a PPS/R Coordinator is likely to encounter frequently.

assembly - assembled relationship of two or more subassemblies and/or parts joined together to perform a specific function.

basic Digital products or applicable systems - "basic" Digital products are those central processor or peripheral devices, subassemblies, or modules designed and developed (or purchased) for use in a multitude of Digital business areas or Digital product line applications. These products are by definition Data Processing/Office Machine Equipment (DP/OM).

bonding - making an electrically conductive connection between parts of equipment that are required to be grounded, and some other part of the equipment to which a grounding conductor is to be connected.

branch circuit - that portion of the building wiring system beyond the final overcurrent device on the power distribution panel protecting the circuit to the field wiring terminals in a permanently connected unit or to the receptacle outlet for cord-connected units.

CSA-certified - this category is similar to UL-listed. CSA certification is required for products sold in Canada. These products must bear the CSA monogram. CSA certification can be accomplished either through plant certification (see CSA Bulletin 272) or by an individual product submission process similar to UL's.

class 1 equipment - equipment having at least functional insulation throughout and provided with a protective earthing terminal or contact and, for equipment designed to be connected by means of a flexible cord, provided with either an appliance inlet with protective earthing contact, or a non-detachable flexible cable or cord with protective earthing conductor and a plug with protective earthing contact.

clearance - the shortest distance between two conductive parts, or between a conductive part and the bounding surface of the equipment, measured through air. (As defined in *\DEC STD 119-2*

The bounding surface is the outer surface of the enclosure considered as though metal foil were pressed into contact with accessible surfaces of insulating material.

If a barrier is interposed, the distance is measured over the barrier. If the barrier is in two parts with mating surfaces that are not cemented together, the distance is measured through the joint.

codes - a set of rules or standard of professional practices, procedures and technical parameters designed to secure uniformity and to protect the public interest. Codes are frequently adopted by government agencies as legal requirements enforceable by law. Examples include the National Electrical code.

component - basic element of a higher level assembly. Usually electrical/electronic in nature.

combustion - the continuous burning that follows after ignition. It involves oxidation accompanied by the evolution of heat and usually light.

construction drawings - drawings depicting manufactured items and their assemblage requiring form, dimensions, material, finish, tolerances, and other requirements as applicable.

construction support drawing - drawings or lists depicting support information required to complete the assemblage or procurement of parts necessary for the completion of a finished item.

creepage distance - the shortest path between two conductive parts, or between a conductive part and the bounding surface of the equipment, measured along the surface of the insulation.

custom Digital products or applicable systems - custom Digital products are those devices or systems designed, modified, configured or integrated for a single or few customers or application. (CSS)

danger - combination of severity of hazard and the risk that the hazard will occur.

dead metal - conductive material that does not normally have a potential with respect to ground.

data processing equipment - electrically-operated units that, separately or assembled in systems, accumulate, process, and store data. Acceptance and divulgence of data may or may not be electronic means.

detachable cable or cord - a flexible cable or cord, for supply purposes, intended to be connected to the equipment by means of a suitable appliance coupler.

double insulation - insulation composed of both functional insulation and supplementary insulation.

electric shock - the likelihood of personal injury from electric shock is to be considered to exist at any exposed part of a unit or system if the available open-circuit potential is higher than 42.4 volts peak and the available current through a 1500-ohm resistance is more than 5 milliampers.

enclosure - any part that houses electrical components and live parts which involve a shock or energy hazard, in order to prevent accidental contact or to confine a fire hazard. It may be an integral part of the components, a separate item, or part of the ultimate enclosure (such as, the outer cabinet).

energy hazard - the possibility of damage and/or personal injury (other than by electric shock) from available electrical energy is to be considered to exist at any exposed live part of a unit or system if, between the exposed live part and an adjacent dead metal part or live part of different potential, there exists a potential of 2 volts or more and either (1) an available continuous power level of 240 volt-amperes or more, or (2) a reactive energy level of 20 joules or more. For example, jewelry, a tool, or other metal inadvertently short-circuiting a component could cause a burn or a fire if sufficient energy is available at the component to vaporize, melt, or more than warm the metal.

field-wiring terminal - any terminal to which a supply or other wire can be connected by an installer in the field is a field wiring terminal, unless the wire is provided as part of the unit and a connector, soldering lug, soldered loop, or crimped eyelet is assembled to the wire.

finished items - units identified by model numbers which may or may not be physically stocked; always depicted by a unit assembly drawing.

fixed equipment - equipment that is fastened or otherwise secured at a specific location.

flammability rating - the qualitative degree to which any substance is easily ignited, burns intensely, or has a rapid rate of flame spread. For instance, UL: 94V-0; 94V-1; 94V-2, etc.

foamed plastic classed HF-1 - foamed plastic material that may flame or glow and release flaming or glowing particles or flaming drops that do not ignite surgical cotton when tested in accordance with Section 2, subhead 7 of DEC STD 119.

foamed plastic classed HF-2 - a foamed plastic material that may, when tested in accordance with Section 2, subhead 7 of DEC STD 119, flame or glow but will extinguish within a prescribed period of time. Flaming or glowing particles or flaming drops released may ignite surgical cotton.

foamed plastic classed HBF - a foamed plastic material that, when tested as indicated in Section 2, subhead 7.3 of DEC STD 119, burns with specified maximum burning rate.

functional insulation - the insulation necessary for the proper functioning of the equipment and for basic protection against electric shock.

gauges - wherever they appear in this standard, the abbreviations MSG, GSG and AWG mean, respectively, Manufacturer's Standard Gauge for Steel Sheet, Galvanized Sheet Gauge, and American wire Gauge. References to sheet metal by gauge number are intended only as auxiliary information. Sheet metal of the indicated gauge number is not acceptable if the forming processes have reduced the thickness of the sheet to the point below the specified minimum acceptable thickness.

GMP - good manufacturing practice

ground fault interrupter - a fast acting circuit breaker that is sensitive to very low levels of current leakage to ground. The interrupter is designed to limit the electric shock to a current and time duration value below that which can produce serious injury.

grounded - connected with the general mass of the earth through a grounding system of sufficiently low impedance and having current-carrying capacity sufficient at all times, under the most severe conditions which are liable to arise in practice, to prevent any current in the grounding conductor from causing a harmful voltage to exist between exposed conductive parts of equipment and neighboring conductive surfaces that are likely to be in good contact with the earth.

group - combination of unit assemblies and interconnecting parts which constitutes a subdivision of a system. As a group, it is not capable of performing a complete operational function.

hand-held equipment - portable equipment intended to be held in the hand during normal use, the motor, when provided, forming an integral part of the equipment.

hazard - potential to do harm to person or property.

IEC 435 - this category indicates that a unit is constructed in accordance with the international requirement for data processing products. These parts could be listed or certified by UL. Special marking will appear on the units.

IEC-harmonized - a national standard, is said to be harmonized if it is not in conflict with the equivalent IEC standard. The country will most likely test to its own standard. There may be areas covered by the specific country but not by the IEC Standard. Therefore, these need to be identified and addressed before marketing in that country.

impedant neutral - a neutral conductor of a power system which is not directly grounded but connected to ground through an inductor or resistor. It allows a ground fault in the power system to trigger an alarm without shutting down power, which allows repairs to be deferred to a more convenient time. Digital's products are not generally designed for, and should not be used on, impedant neutral power systems.

interlock - a device which interacts with another device or mechanism to govern succeeding operations.

live parts - metal or other conductive parts that, in normal use, have a potential difference with respect to earth ground or any other conductive part.

machine guarding - the installation of equipment or safety devices of machines/units to eliminate hazards created by their operation.

manufactured items - items, or an assemblage of items, which required a prefabricating process; always depicted by a construction drawing.

market specific Digital products or applicable systems - "market specific" Digital products are those devices or systems designed, modified, configured or integrated specifically other than DP/OM (telecommunication, medical, etc). These are products of some volume expectations (as opposed to custom type products).

The use of any basic Digital product or system in a market specific type application also constitutes a market specific Digital product.

material classed V-1 - material that may flame or glow and release glowing or flaming particles and/or flaming drops but that does not ignite surgical cotton when tested in accordance with DEC STD 119, Section 2, subhead 7.

material classed V-2 - material that may flame or glow and release glowing or flaming particles and/or flaming drops that ignite surgical cotton when tested in accordance with DEC STD 119, Section 2, subhead 7.

material class HB - material that burns (flames or glows) with specified maximum burning rates when tested as indicated in DEC STD 119-02 subhead 7.2.

movable equipment - equipment that is either:

a. less than 18 kg in mass or equivalent pounds, or

b. equipment with wheels, casters, or other means to allow movement by the operator as required to perform the intended use.

noncombustible - a material is to be considered noncombustible if it has a flame-spread rating of zero when tested in accordance with UL 723, Test Method for Fire Hazard Classification of building materials.

normal load - the load that approximates as closely as possible the most severe conditions of normal use, any marking of short-time or intermittent operation being observed and, unless otherwise specified, heating elements, if any, being operated as in normal use. this excludes motor starting current, unless such current is part of a normal, repetitive cycle.

operator access area - an area to which, under normal operating conditions, access can be gained under any one of the following conditions:

a. Without use of a tool

b. Any area that is defined by the manufacturer as an operator access area

c. Access is deliberately provided to the operator

Note: Examples of operator access area follow:

1. External surfaces and operating controls.

2. Where accessories are attached by means of attachment plugs and receptacles or by means of other separable connectors.

3. Where tapes, ribbons, paper, toner, etc., are replaced and complicated operations are not involved.

4. Where recording tapes, disks, program boards, punched cards, paper forms, etc., are replaced.
5. Where lamps and fuses are replaced or circuit breakers are reset when manufacturer's instructions specify those activities as operators' duties.
6. Where routine operating adjustments are made to adapt the machine for its different intended functions.
7. Where access is provided for routine cleaning, or clearing of jams of paper or data-handling media.

part - one piece, or several pieces which are not normally subject to disassembly without destruction of the designed use.

pinch point - any point at which it is possible to be caught between the moving parts of a machine/unit or between the material and the moving parts of a machine/unit.

portable equipment - equipment having an individual power supply cord and which either:

a. Is moved while in operation in order to perform its intended function.
b. Is designed to be carried by means of properly designed handles, straps, etc., while connected to the supply.
c. Is a light-weight, table-top device (22 pounds/10kg max.)

primary-circuit power - power derived from a branch-circuit power line or from an ac or dc motor-generator set installed separately from or included as a part of a unit or system is primary-circuit power.

primary circuits -

a. Cord-Connection Units: Wiring and components between the attachment-plug cap on the cord assembly and the primary winding of motors, transformers, and other loading devices.
b. Permanently Connected Units: Wiring and components between the field-wiring terminals and the primary windings of motors, transformers, and other loading devices.

printed cable - the finished combination of conductive paths in one or several layers within a flexible strip of insulating material.

printed-circuit board - completely processed printed-wiring and printed-component configurations on a common base, or a printed-wiring board with all electrical and/or mechanical components attached. Within Digital, "module" is a synonym for printed-circuit board.

printed-wiring board - completely process printed-wiring configurations (conductor patterns only, no components) on a common base; includes standard density, high density, very high density, fineline, single sided, print-and etch, print-plate-and-etch, plated-through-hole, multilayer, multisignal layer, flexible boards.

product liability - the accountability/responsibility a manufacturer may incur as the result of some defect in the product he has sold or manufactured.

purchased items - items, or an assemblage of items, procured exclusively from a vendor or manufacturer.

rated current - the normal input current at full load and rated voltage.

rated voltage - the input voltage. For three-phase supply, the phase-to-phase voltage.

reference drawing - documents - drawings or lists depicting size, location, arrangement, flow, timing, instruction, connections and specifications; normally do not contain fabricating characteristics.

refurbished Digital products or applicable systems - refurbished Digital products are those devices or systems which are repurchased and remanufactured (rebuilt) Digital products intended for resale.

regulations - administrative rules/orders having the force of law issued by a governmental unit to implement legislative enactments.

reinforced insulation - an improved functional insulation with such mechanical and electrical qualities that it provides the same degree of protection against electric shock as double insulation.

repair - restoration through corrective action to enable conformance to specification.

retrofit - a modification made to include the changes made in later production units.

risk - possibility or probability of occurrence.

safety circuit - any primary or secondary circuit that is relied upon to prevent damage or personal injury. An interlock circuit, for example is to be considered a safety circuit.

safety extra-low voltage (SELV) circuit - a circuit that is designed and protected so that under normal and fault conditions the voltage between any two accessible circuits, one of which may be the body or earth, does not create a shock hazard.

safety isolating transformer - for use in data processing equipment, a transformer in which windings supplying SELV circuits are isolated from other windings such that an insulation breakdown either is unlikely or does not cause a hazardous condition on SELV windings.

secondary circuit - a circuit that has no direct connection to primary power and derives its power from a transformer, converter, or equivalent isolation device situated within the equipment.

shock hazard - a hazard considered to exist at any exposed part of a unit if the available open-circuit potential is more than 42.4 volts peak and the available current through a 1500-ohm resistance is more than 5 milliampers.

skilled person - one who is trained in the technology of electrically-powered data processing equipment and who is adequately aware of the hazard associated with this type of equipment.

specifications - documented detailed descriptions covering all pertinent aspects of the product, i.e., materials, process, performance criteria, physical/electrical/mechanical parameters, etc.

standards - "yard sticks" that are established by authority, custom or general consent as a model or example which must be followed.

stationary equipment - either fixed equipment or equipment that cannot easily be moved from one place to another.

subassembly - two or more parts which form a portion of an assembly. A unit replaceable as a whole but having a part of parts which are individually replaceable.

supplementary insulation (protective insulation) - an independent insulation provided in addition to the functional insulation, to protect against electric shock in the event of a failure of the functional insulation.

supply cord - a length of flexible cord or computer cable to one end of which an attachment plug cap is attached for the purpose of connection to the branch circuit power line and the other end of which is attached to primary circuit in a unit.

system - an assemblage of groups, unit assemblies, and their interconnecting parts designed to perform an operational function or functions.

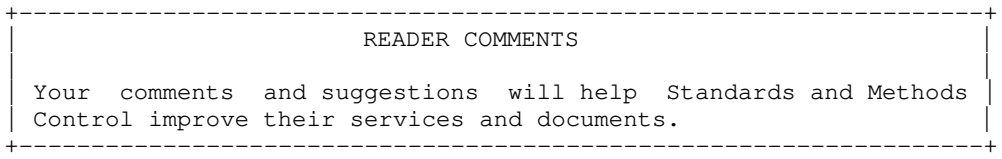
tool - any object which may be used to operate a screw, latch, or similar fixing means.

UL-listed - this means the product is monitored by UL and is deemed to be safe in its end use application. Units in this category will have the UL listing monogram on them, and these product types will be listed on the UL White Card Index.

UL-recognized - these products are formally "UL Recognized" and are listed under Digital's name by specific model number on the UL Recognized Component Index (yellow card file and yellow component book). They may be advertised and sold to OEM users as "UL Recognized Components." There is no UL monogram affixed to these parts. A special UL symbol, optional as far as UL is concerned, may be used. Digital does not currently apply this symbol. For internal control purposes only, Digital uses the UL recognized symbol, a sticker imprinted with a reversed "UR".

unit - a unit is a portion of a system that is identified by a manufacturers' model number or type designation. A unit is supported by a frame or frames and is self-enclosed or designed to be attached to another device.

unit assembly - an assemblage of parts, subassemblies, and assemblies to form finished items capable of independent operation.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